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Step by step: Applying a stage-based approach to improve the effectiveness of social norm interventions in encouraging sustainable consumer behaviours.

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A thesis submitted for the Degree of Doctor of Philosophy

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July 2019

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Abstract

High levels of meat and dairy consumption have significant impacts on both environmental and health factors. In areas where meat and dairy intake is high such as the UK, reductions on meat consumption could significantly contribute to reducing greenhouse gas emissions, nitrogen pollution and saturated fat consumption. This thesis therefore focuses on a novel approach using social norms. We link different social norms to their role in encouraging individuals through the process of behaviour change to reducing their meat consumption. This context is used to contribute to theoretical discussions of social norms and the stages of change model as well as sustainable consumption more generally. Social norms are understood as an individual's perception of behaviours that others approve or disapprove of (injunctive social norms) or what others are doing (descriptive social norms). Injunctive and descriptive norms can both encourage sustainable consumption behaviours but in different ways. Extant research has shown some inconsistent results in the social norms literature, for example there are contradictory results in relation to towel reuse & energy reduction. These inconsistencies suggest that our understanding of the operation of social norms may be limited, and as such further investigation is required to establish when social norms approaches are likely to be most effective and why. One area that social norm intervention studies have failed to take into account is the dynamics of change already taking place within the populations that they target. Therefore, in contrast to existing studies on social norms our approach understands behaviour change as a process as opposed to an event, where there are several distinct stages of change. This perspective is informed by evidence that meat reducing behaviours are adopted in a manner consistent with the self-regulated model of behaviour change This suggests that understanding the dynamics of change is crucial to determine what factors are most likely to change individuals behaviour, and thus how social norm interventions should be targeted for maximum effect. We suggest that different social norms will become more or less effective depending on the stage of change the individual they are targeting is at due to the fact that they play different roles at the different stages of behaviour change. We explore the role of social norms in the stages of change model over three empirical studies. Firstly, we look at how descriptive and injunctive norm interventions influence the different transition points in the stages of change model. We then undertake a longitudinal study looking at how injunctive norms differently impact meat consumption depending on the stage of change of the individual they are targeted at. Finally, we model how injunctive, descriptive and trending models operate in the stages of change process to explain the mechanisms of how social norms assert influence at the different stages of change. We find that social norms do become more or less effective depending on the stage of change they are targeted at and find significant relationships in our modelling paper that explain the role of each different type of social norm. With these results we contribute both to the understanding of how social norms influence sustainable consumer behaviours as well as adding a new understanding of the importance of social norms in the stages of change model. This could have significant implications for social marketers and policy makers alike as they look to encourage sustainable consumption behaviours.

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Step by step: Applying a stage-based approach to improve the effectiveness of social norm interventions in encouraging sustainable consumer behaviours.

Chapter 1: Introduction

Introducing the research question

This thesis sets out to take two theories that both explain and can be harnessed to encourage sustainable consumer behaviours and develops them simultaneously to firstly: improve their ability to explain how individuals adopt sustainable consumer behaviours, and secondly: how this enhanced understanding can be harnessed to allow each theory to be more effectively applied in interventions that aim to encourage sustainable consumer behaviours in individuals. The two key theories that link all the research put together in this thesis are social norms theory (Cialdini, 1990) and the stage model of self-regulated behaviour change or 'SSBC' (Bamberg, 2013). Social norm theory looks at how individuals' perceptions of the world around them can influence their behaviour whilst the SSBC explains both the process of how individuals change repeated behaviour and the factors that drive that change each step of the way. The rationale for looking at these two theories together to inform and develop each other will be set out in detail in this chapter; but in summary we take the position that social norms theory still has gaps in its understanding of how social norms lead to behaviour changes and that this can lead to inconsistent results when they are manipulated to try and change behaviours. We believe that by understanding the role they play in the process of behaviour change (using the SSBC model to understand that change process) we can better explain how different social norms lead to significant behaviour changes in some scenarios and not in others. Furthermore, we also take the position that the way social norms are currently represented in the stages of change model does not fully align with what we currently know about how social norms effect behaviours. Therefore, by using this knowledge of social norms we propose that they will operate in a different way at the different stages of change than they are currently theorised to. The essence of these dual aims for our research leads to the following overarching research question that we set out to answer:

How do social norms guide individuals through the stages of change to lasting sustainable consumer behaviour changes?

Our key contributions in this thesis are to answer the above question by showing how descriptive, injunctive and trending norms can be integrated into the SSBC and as such explain a mechanism by which social norms cause individuals to move through the stages of change. We also contribute by showing that injunctive norm interventions differentially impact behaviour changes depending on the stage of change the individual to whom they are targeted is currently at. We also contribute to growing bodies of literature that show how the SSBC model explains sustainable consumer behaviours, also we contribute to social norms literature by showing how injunctive norms can reduce the proportion of meat that people eat over time.

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Literature review

What are sustainable consumer behaviours?

Unsustainable consumption behaviours are both directly and indirectly significantly contributing to global environmental degradation (IPCC, 2014). This is recognised by the fact that sustainable consumption and production is listed as one of the sustainable development goals by the UN (UN general assembly, 2015). The environmental imperative to has led to significant attention from various academic disciplines looking to understand how human consumption can be made more sustainable (Jackson, 2005). Though some progress has been made, there is still significantly more change required in order to prevent the worst impacts of environmental issues such as climate change (IPCC, 2014). Part of the solution to this consumption problem could be realised if governments, businesses and other organisations are willing and then able to successfully encourage consumers to consume more sustainably. Many ways of consuming more sustainably are known to individuals, organisations and legislators, yet this as has not resulted in significant enough behaviour change in order to slowdown the environmental degradation. There is a challenge to make sustainable consumption behaviours more pervasive in our society. In short more people need to consume more sustainably across many different areas.

We define sustainable consumption broadly as consumption behaviours that minimise an individual's direct and indirect impact on the environment, whilst simultaneously boosting or maintaining individual and collective wellbeing (Jackson, 2005). In essence, sustainable consumption looks to limit the negative impacts associated with consumption without compromising living standard. Of course, within the broad definition of sustainable consumption, different behaviours have different environmental impact, and depending on which environmental measure you take some will be more harmful than others. It is generally accepted however that transport, energy usage and diet are the key factors that determine and individuals' environmental impact, particularly in relation to their greenhouse gas emissions. Whilst these broad groups of behaviour are the most environmentally harmful, they are also potentially the hardest to shift given that we repeat many travel, eating and energy using behaviours on a daily basis. This often means that many of the harmful behaviours that fall under these categories are habitual and done with very little thought on an individual level, and normative and widely accepted on a social level. For companies or policy makers that wish to shift these behaviours they therefore have the combined challenge of not only moving people away from their current ingrained and habitual behaviours, but they have to do so when the very behaviours that they want to change are highly relevant and completely normal and acceptable in our societies in spite of the harm they are inflicting.

Why meat consumption?

The consumption of meat and dairy products is growing worldwide with western diets in particular being characterised by the high proportion of animal foodstuffs included in them (Westhoek et al, 2014). Such high levels of meat and dairy consumption has significant impacts on both environmental and health factors (Tukker et al., 2011, Macdiarmid et al., 2012, Bailey and Harper, 2015). In areas where meat and dairy intake is high such as in EU countries, reductions on meat consumption could

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significantly contribute to reducing greenhouse gas emissions, nitrogen pollution and saturated fat consumption (Westhoek et al, 2014). Reducing meat and dairy consumption can therefore fairly be understood to fulfil the criteria of sustainable consumption as set out by Jackson (2005), in that it minimises an individual's direct and indirect impacts on the environment, whilst simultaneously preserving or boosting individual and collective wellbeing.

How do we encourage sustainable consumer behaviours?

There are a multitude of ways that it is theorised sustainable consumer behaviours can be encouraged (Jackson, 2005). Different theoretical perspectives offer explanations for sustainable consumer behaviours as (amongst others) a matter of rational choice (Azjen, 1991), compelled by a personal morals (Schwartz & Howard, 1981; Stern et al, 1999), defined by habit and automaticity (Verplanken & Wood, 2006), a product of social influences (Cialdini, 1990; Sparkman & Walton, 2017) and defined by our culture (Douglas, 1997). A matter of considerable contention in research aimed at encouraging sustainable consumer behaviours is a debate as to whether we should focus on motivating individuals to change or instead focus on structural and societal changes (Shove, 2010; Shove, 2011; Whitmarsh et al, 2011). Our research focuses on how we can understand individuals' motivations and use them to change their behaviour rather than looking at structural solutions. We do not take this approach because we consider structural approaches unnecessary or ineffective, but because understanding why individuals consume as they do and how to change their behaviours can play an important role in changing behaviours *en masse*. Moreover, we take the view that individuals actions cannot be taken in isolation, one individual changing their behaviour does not only impact them and their environmental impact but has the potential to change those around them (Christakis & Fowler, 2009; Iyengar et al, 2015). It is also important to add that by taking the route of researching individual behaviour changes we are not looking to put the blame solely on individuals' actions whilst ignoring governments or corporations. Understanding how individuals change their behaviour and can be encouraged to change is an important part of designing effective policies at a structural level, reframing of policy in line with a better understanding of the behavioural implications can drastically improve its effectiveness as has been seen with reforming the system of opting into pensions in the UK (ONS, 2018). Therefore, in spite of critique of the individual approach to changing consumption behaviours (Shove, 2010, Peattie, 2010), we feel that it is still a justifiable route to addressing the environmental problems associated with consumption.

Attitudes and Behavioural control

There have been many different theoretical approaches to explaining individual consumption behaviours on an individual level and each approach has different implications for how we can try to encourage more sustainable consumption. Perhaps the most used approach is that of Azjen's (1991) theory of planned behaviour (TPB. The theory of planned behaviour assumes that sustainable consumption behaviours will result as a consequence of individuals forming behavioural intentions to consume more sustainably. The theory suggests that behavioural intentions are formed when individuals have a positive attitude towards the new behaviour, and they believe that they would be able to change as they have control over the behaviour (perceived

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behavioural control. Also, the TPB sets out the role of subjective social norms in leading to behavioural intentions, suggesting that perceptions about what others think of the behaviour will impact the intention to perform it. There is a significant amount of evidence that supports the relationships proposed in the TPB (e.g. Taylor & Todd, 1995; Harland et al, 1999; Bamberg et al, 2003). However, there is also much critique of the model, namely that it doesn't take into account the role of individuals morals, emotions or habits in people's behaviour when they are also important factors in determining how people act (Jackson, 2005). Furthermore, there is significant evidence of an intention-behaviour gap in the context of sustainable consumer behaviours (Hassan et al, 2016) which given that the TPB assumes intentions lead to behaviour is a significant problem for the efficacy of the theory as a way of understanding and encouraging actual behaviour changes.

Personal Norms

Personal moral norms are also seen as an important motivator for sustainable consumer behaviours. Schwartz & Howard's (1981) norm activation model (NAM) explains how personal norms (feelings of a moral obligation to act in a certain way) lead to environmental actions such as sustainable consumer behaviours. The premise of the model is that an individual being aware that there is a problem with their current behaviour, and a feeling of responsibility for the negative consequences of that behaviour will lead to a sense of personal obligation to behave sustainably. The evidence shows that the factors that influence behaviour in the NAM are formed in a linear fashion, i.e. first an individual must be aware of the negative consequences of their behaviour before being able to feel responsible for the negative consequences and they must feel responsible before feeling a personal obligation to act (the personal norms (De Groot & Steg, 2009; Steg & De Groot, 2010).

Personal Values

The value-belief-norm theory of environmentalism (VBN) then provides an extended version of the NAM showing the role of personal values and an ecological worldview in the formation of personal norms (Stern et al, 1999). Values are seen as guiding principles in an individual's life (Steg & Nordlund, 2012) and in the VBN an individual's values predict their ecological worldview (i.e. how they believe humans should interact with the environment). An individual's ecological worldview then determines the likelihood that they will become aware of the environmental consequences of the way that they currently behave. This then links values and ecological worldview with the NAM, with the VBN then continuing as the NAM does where awareness of consequences lead to ascription of responsibility and a personal norm is formed meaning an individual feels a moral compulsion to act. Between the studies using the NAM and the VBN there is a significant amount of evidence that shows personal norms leading to sustainable consumer behaviours. For example, energy conservation (Black et al, 1985; Abrahamse & Steg, 2011), reduced car usage (Abrahamse et al, 2009) and water conservation (Harland et al, 1999). However, personal norms have been shown to be less good at predicting sustainable consumer behaviours where behaviour change is more difficult (Bamberg & Schmidt, 2003), furthermore Bamberg & Schmidt (2003) also provide evidence that the TBP is better at predicting sustainable consumer behaviours. Therefore, whilst there is much evidence that personal norms play an important role in encouraging sustainable consumer behaviours, relying on

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individuals feeling a moral compulsion to act may not be sufficient to encourage more difficult sustainable consumer behaviours such as reducing meat consumption.

Social Norms

The models discussed so far by on large to not consider many of the different social influences that individuals face that have an effect on their behaviour. The TPB and NAM both consider subjective norms, however there are many more social influences that individuals face that impact their actions and have effects over and above that of the subjective norm (Abrahamse & Steg, 2013). Individuals behaviour can be influenced by those around them in many different ways for example through our social networks (Granovetter, 1977; Christakis and Fowler, 2009; Iyengar et al, 2015), social learning (Bandura & Walters, 1977) and comparing themselves to others (Festinger, 1954). However, one of the most common ways that researchers and practitioners have used to manipulate behaviour using social influence is the social norms approach (Cialdini, 1990).

Evidence of social norm interventions

The wide application of social norms can be attributed to the fact that they are relatively easy to apply in many different contexts with little resources (Brent el al, 2015) and have been shown as effectively encouraging sustainable consumer behaviours across different contexts e.g. (Schultz et al, 2007; Goldstein et al, 2008; Allcott, 2011). The focus theory of normative conduct classifies norms into two distinct types, the injunctive social norm, and the descriptive social norm (Cialdini et al, 1990; Cialdini et al, 1991). The injunctive norm refers to individuals' perceptions of what others around them deem to be acceptable behaviour. The descriptive norm refers to an individual's perceptions of what others around them are actually doing. The focus theory of normative conduct dictates that individual's behaviour will be influenced by the norm when they are made salient, so that an individual focus on them when deciding to perform a particular behaviour (Cialdini et al, 1990). Descriptive and injunctive norms can be made salient in various ways. Individuals may take cues from their immediate environment, for example perceiving that most others litter when walking through a heavily littered street. Individuals can be made aware of social norms through messages that tell them what most people do or approve of, thus manipulating their own perceptions of what others do and/or will approve of (e.g. Goldstein et al, 2008; De Groot et al, 2013). Furthermore, providing comparisons of one's own behaviour to a reference group showing what others are doing can change an individual's perceptions of what is the done or acceptable thing to do (Schultz et al, 2007; Alcott 2011). When made salient, individuals often act in line with the norm and as such when manipulated have been shown to effectively encourage sustainable consumer behaviours such as reducing household energy usage (Göckeritz et al, 2010; Nolan et al, 2008), sustainable horticultural practices (White & Simpson, 2013), reducing littering (Cialdini et al, 1990) and re-using plastic bags (De Groot et al, 2013). There is also evidence showing that descriptive and injunctive norms have a greater influence on behaviour when they are aligned (Schultz et al, 2008). Whereas situations where injunctive and descriptive norms conflict with each other can actually have a negative effect leading to more unsustainable behaviour (Keizer at al, 2011).

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Social norms ability to guide behaviour unconsciously

Whilst social norms have been successfully leveraged by making individuals explicitly aware of a norm through an intervention (e.g. Schultz et al, 2007; Goldstein et al, 2008; White & Simpson, 2013) suggesting that an individual consciously responds to the norm being made salient, there is also evidence to suggest that individuals unconsciously follow norms in certain scenarios. The social intuitionist approach (Haidt, 2001) suggests that behaviours often stem from the 'intuitive system', rather than the 'reasoning system'. That is to say that behavours often arise from an unintentional and automatic process rather than one of intent and control (as is assumed by many behavioural models in psychology e.g. {Azjen, 1991, Schwartz & Howard, 1981, Stern et al, 1999}). In the social institutions model social influences play a role in that individual's intuitions are derived from 'peer socialization'. That is to say individual's private judgements are a product of others private judgements without rationalisation. Applying this logic to social norms (what others do and their moral judgements of behaviours) would suggest that individuals respond norms often in an intuitive manner rather than using it in order to reason about their own behaviour or judgements. This is contrary to how social norms are presented in many behavioural models where social norms are theorised to effect behaviour when mediated by an intention to change behaviour (e.g. Ajzen, 1991; Bamberg, 2013). There is also however evidence to suggest that social norms can lead to behaviours without a conscious reasoned process. Nolan and colleagues (2008) present evidence that social norms are perceived as unimportant in the decision-making process, yet effective at causing behaviour change, therefore suggesting that norms can alter behaviour without playing a part in a deliberative reasoning. In another example of how social norms can shape behaviour without a deliberative process, (Aarts & Dijksterhuis, 2003) show that situational norms (where there is a strong association between environment and behaviour) are able to guide behaviour directly without being prompted what the norm is in a given environment. This suggests that where there are already strong associations between a physical environment and a certain behaviour (e.g. speaking quietly in a library), the mere presence of the environment is enough to illicit behaviour without an external trigger of the norm. The caveat to this is that it only works where those strong associations are already formed between environment and behaviour. In the case of sustainable consumer behaviours that are still relatively recent in their formation and often undertaken by a minority of people in many physical environments (for example, there are likely a small minority of restaurants where eating vegetarian food is the norm). This means that it is less likely for individuals to have formed associations around such sustainable consumer behaviours for them to unconsciously react to social norms as the link between sustainable consumer behaviours and physical environments has yet to be established in many contexts.

The papers discussed above provide a snapshot of an established strand within the literature that shows social norms can influence behaviour without the requirement of a deliberative thought process mediating their effect. However, they key aim of this thesis is to explore the role of social norms in generating lasting sustainable consumer behaviour changes over time. There is a strong body of research (reviewed below) which suggests that in order to change complex behaviours in the longer term requires effortful self-regulation on behalf of the individual (Prochaska & Velicer, 1997: Bamberg, 2013; Klockner 2014). Therefore, in order to try and explain how social

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norms can play a role in changing a complex sustainable consumer behaviour (meat consumption), this thesis focuses on how social norms can lead to movement through a deliberative conscious process of behaviour change rather than their ability to guide behaviours unconsciously in specific contexts. The key assumption behind this focus is the requirement for deliberative effort on behalf of an individual in order to break out of entrenched unsustainable behaviours.

Distinguishing injunctive and descriptive social norms

In order to discern how social norms can lead to long term behaviour changes it is also important to note that injunctive and descriptive norms do not influence behaviour in the same way, in fact there is much evidence to suggest that they can impact behaviour differently in a given context (Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013). Injunctive norms are seen as prescriptive in nature, they suggest to individuals what others around them would expect or want them to do. They effect behaviour as they suggest to individuals that there may be negative social consequences of not complying with the norm or conversely that others will see them more favourably if they do comply with the norm (Cialdini et al, 1991). Descriptive norms on the other hand can influence behaviour through signalling to individuals what is an effective behaviour to undertake in a given context (Cialdini, 1991; Melnyk et al, 2013). Individuals are therefore more likely to act in line with the norm so that they can accrue the benefits of the most effective behaviour in a given context as signalled to them by what they perceive others around them are doing.

The different ways in which descriptive and injunctive norms impact behaviour leads to them being more or less effective at encouraging sustainable consumer behaviours dependent on the context. For example, descriptive norms become effective than injunctive norms at encouraging sustainable consumer behaviour when the behaviour is subject to less self-regulatory control (Jacobson et al, 2011). In essence when individuals are putting less effort into enacting a certain behaviour, descriptive norms have more influence than injunctive norms. Conversely, when an individual has already been trying the new behaviour, descriptive norms can potentially have a boomerang effect (in that they relapse back to unsustainable behaviour) if an individual is now acting more sustainably than others around them due to their change. However, a salient injunctive norm in the same scenario encourages continued sustainable behaviour (Schultz et al, 2007). Also important in determining the effectiveness of different social norms is the level of self (i.e. are individuals considering themselves as an individual or as part of a collective/society). When people are focused on their individuality (individual level of self) their behaviour is less likely to be affected by an injunctive norm being made salient (White & Simpson, 2013). However, when they consider themselves a part of a group or society, the injunctive norms are effective at encouraging sustainable consumer behaviour. Conversely the descriptive norm is effective at encouraging sustainable consumer behaviour when either individual or collective levels of self are activated, thus giving credence to the idea that descriptive norms can signal personal benefits or enacting a certain behaviour, not just the social benefits.

In spite of the evidence pointing to a clear conceptual distinction between descriptive and injunctive norms, they can be difficult distinguish empirically. Partly behind this

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could be that individuals underestimate the importance of norms on their behaviour and therefore normative social influence remains under detected (Nolan, 2008; Barth et al, 2016)). Similarly, in different contexts norm types can be aligned or incongruous with each other (Chung & Rimal, 2016), meaning that in many studies where one type of social norm intervention is used, the interaction with other social norms is unknown. Complicating the matter further is the fact that there is mixed evidence relating to the effects of incongruous and congruous social norms impact on behaviour (Smith et al, 2012; McDonald et al, 2014). The complex and sometimes unexplained interactions between norms and individuals' tendencies to underplay norms create a difficult environment within which to discern their effects. However, the presence of significant evidence from experimental studies that show distinctly different impacts when different types of norm are prompted re-enforces the need to persist with distinguishing between different types of norms in order to more fully understand how they impact on behaviours.

It is therefore important to consider injunctive and descriptive norms as distinct and separate influencers of behaviour, as they do not encourage behaviour in the same way or yield similar results across different contexts. Therefore, in order to target different social norms to effectively encourage sustainable consumer behaviours, we must understand when injunctive and descriptive norms are likely to be the most effective. One area that is yet to be explored in relation to the differential impact of norms is how they are impacting individuals as they are in the process of longer-term behaviour changes. Given that different social influences become more or less effective at encouraging behaviour in social networks depending on whether they are aimed at encouraging a trial or a repeat behaviour (Iyengar et al, 2015), we suggest that social norms are likely to be more or less effective at encouraging behaviour change in individuals depending on where they are in the process of changing their behaviour.

Stage models explaining the process of adopting sustainable consumer behaviours

A significant barrier in the way of changing them to sustainable consumer behaviours are habits (Verplanken and Wood, 2006). This is particularly the case in behaviours that are undertaken on a regular basis (Ouellette & Wood, 1998). Habits therefore are likely to be a significant barrier to individuals changing regularly repeated behaviours such as their diet. In order to overcome existing unsustainable habits, it has been suggested that individuals need to engage in effortful self-regulation and go through a process of behaviour change whereby existing habits are broken down and replaced with new behaviours (Bamberg, 2013). Several behavioural models explain the process of how individuals go through the process of behaviour change and as such how they are able to break existing habits.

Originating in health studies, the trans-theoretical model (TTM) (Prochaska & Velicer, 1997) suggests that behaviour change occurs over a series of stages. The stages start at pre-contemplation, where there is no intention to change the behaviour in the foreseeable future. Then there is the contemplation stage where there is an awareness that change is necessary but without concrete plans to change behaviour soon, this stage can be particularly difficult to move people on from (Prochaska, 2013). This is

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then followed on by the preparation stage whereby there is a specific intention to undertake the target behaviour in the immediate future. Following on from preparation is action whereby the new behaviour is enacted. Then follows maintenance whereby people make active effort to prevent relapsing the behaviour, they become more confident in their ability to continue behaving in the new way as the behaviour becomes embedded. Finally, there is the termination stage where there is no risk of behavioural relapse and the behaviour is fully embedded into the individual's habits/routines. Moving through the stages is not seen as a linear process, with earlier stages potentially taking much longer, and relapses potentially taking place at any stage of change (Bamberg, 2013).

In addition to the stages of change suggested by the trans-theoretical model, they also suggest several different processes of change that mediate the progression between the stages of change.(Prochaska & DiClemente, 1992) suggest that social factors are often an important part of an individual's change, though as yet there has been a lack of research explicitly exploring the varying role of social factors as an individual moves through the stages. Additionally, the trans-theoretical model has been criticised for not being explicit enough about what triggers movement between the stages (Klöckner, 2014). On the back of these critiques, and with an explicit focus on pro-environmental behaviours, the stage model of self-regulated behaviour change (SSBC) was developed (Bamberg, 2013).

Stage based models of sustainable consumer behaviours

Bamberg's (2013) stage model of self-regulated behaviour change (SSBC) also takes an approach of seeing change as a series of stages. Taking the stages from the model of action phases (Gollwitzer, 1990), Bamberg (2013) then hypothesises and tests how different psychological variables impact at different stages of change. The SSBC takes there to be four stages of behaviour change: pre-decision, pre-action, action & post action. This uses the same stages as the TTM, though the preparation/action stages have been merged into just 'action' in the SSBC. It then suggests that the movement between the stages is signalled by the forming of different types of intention that lead to behaviour, this is shown in the model in fig 1. The formation of a goal intention signifies the movement from pre-decision to pre-action. The SSBC understands goal intention to be an individual's formation of a personal goal, or target for reducing an environmentally unfriendly/increasing an environmentally friendly behaviour. Behavioural intention is then understood to be more concrete, with a specific idea what the alternative new behaviour will be to replace the old (e.g. I will replace the red meat in my weekly food shop with plant-based proteins), and this behavioural intention marks the transition from pre-action to action. Finally, implementation intention involves the plan to actually do the behaviour (e.g. I will go to the supermarket on the way home to buy plant-based proteins) which marks the transition to the post-action stage. The post action stage itself is concerned with the maintenance of the adopted behaviour, thus whilst the behaviour has been adopted, there is still an impetus on the individual to avert relapses.

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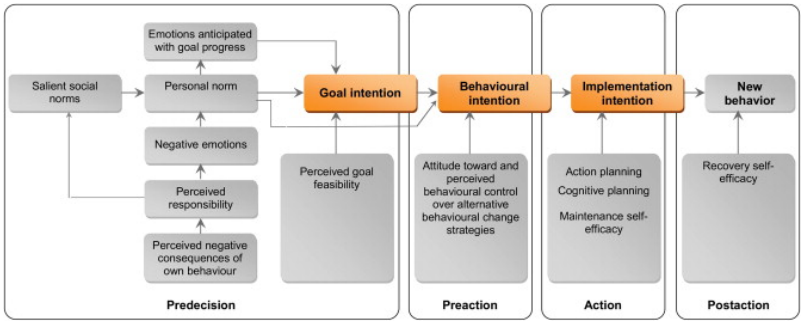
Fig.1. Bamberg (2013) The stage model of self-regulated behaviour change.



In addition to the stages of behaviour change and the intentions that guide the transitions between the stages, Bamberg (2013b) also includes the socio-cognitive factors that lead to the formation of the different intentions. The first intention formation required to move from pre-contemplation to contemplation is the goal intention. The SSCB uses the Norm activation model (NAM) (Schwartz & Howard, 1981) to explain the formation of goal intentions. Bamberg contends that the NAM, which shows the process of becoming aware, accepting responsibility and feeling personal obligation to change, is akin to the formation of a personal goal to behave more sustainably. These variables are perceived negative consequences, perceived responsibility, negative emotions, anticipated emotions, personal norms and social norms. The first two (perceived negative consequences & responsibility) show the process of realisation that one's current behaviour is harmful to the environment/others and that can lead to a feeling of responsibility to change. The 'negative emotions' are included to account for the feelings of guilt one may feel when enacting an unsustainable behaviour when they are already aware of and accept responsibility for the consequences. Personal norms are the feeling of needing to comply with one's own moral standards, which in this case are proposed to stem from the negative emotions, and the salience of social norms. Social norms are what is perceived as the done and/or the right thing to do, these are expanded on more significantly in section 2.41. Finally, the anticipated emotions are what the individual expects to feel when they behave in line with their personal norms, this is expected to be positive in the model as it is the converse of the negative emotions experienced when not behaving in line with personal norms. This stage clearly places significant importance on the role of personal norms/moral standards in the formation of goal intentions, this we would suggest makes the model overly ego-centric and that goal intentions are likely to be more heavily influenced by social factors.

For the next stage of the model (the move from contemplation to action), Bamberg draws from the theory of planned behaviour (Ajzen, 1991) to theorise the variables impacting on the formation of behavioural intentions. In the TPB the three key variables influencing behavioural intention are attitude towards the behaviour, subjective norm, and perceived behavioural control. However, at this stage of the SSBC, the subjective norm is not seen to be important at this stage, as it has played its role in the formation of a goal intention in the previous stage. This is because

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Bamberg (2013b) proposes that by the time the contemplation stage has been reached the salience of social norms will already have caused the individual to consider their personally goals (goal intention). Thus, the variables proposed to impact on the behavioural intention at this stage are the goal intention, perceived behavioural control and the attitudes towards the behaviour.

The formation of an implementation intention is proposed as signifying the transition from action to maintenance of the new behaviour. At this stage, Bamberg (2013a) suggests that the important variables are cognitive planning abilities and skills/knowledge to deal with the behaviour change and potential problems that might be encountered. Cognitive planning abilities refers the ability of the individual to deal with the specific implementation of behaviour, such as the when/where/how. Also important at this stage is 'maintenance self-efficacy'. This refers to the confidence an individual has in themselves being able to continue undertaking the new behaviour without relapsing (Bamberg, 2013d).

Given that the theoretical model itself is fairly recent, empirical testing of the model is as yet sparse, comprising of three main studies. Firstly, Bamberg (2013a) used a cross sectional analysis in order to identify the different stages and variables identified in the model. Using a sample taken from seven different European cities surveying car usage, Bamberg (2013b) found correlational support for the model. This support included the identification of homogeneous sub-groups of behaviour change, the formation of intentions as predictors of switching between the stages, and the psycho-social variables driving the intentions (Bamberg, 2013d). This study was however limited by its cross-sectional design in that it only allowed for a snapshot of behaviours and their drivers at a point in time, as such not allowing it to study change over time. Bamberg (2013a) suggested that this was the key reason for the modest amount of explained variance in the focal behaviour. Another study used the SSBC in a longitudinal study of the dynamics of electric vehicle (EV) purchase (Klöckner, 2014). This study followed the changes in 113 individuals interested in an EV purchase over a two-month period. The study found strong support for the predicted pattern of stage transitions, and also the intentions predicted by the SSBC as pre-cursers of stage change also found support. Finally, the relevance of the SSBC to creating behavioural interventions was tested in (Bamberg, 2013a). This study used tailored interventions based in an individual's stage of change in reducing car usage and found that interventions tailored to the stage of change significantly reduced car usage and was also significantly more effective than other social marketing techniques (Bamberg, 2013a). In summary, there appears to be strong support for the notion that individuals do go through qualitatively different stages of change when switching to sustainable consumption behaviours. Similarly, there have been promising results supporting the idea that different intentions are driving the shifts between the stages. However, the psychological variables driving the intention formation have as yet not received as strong support. This suggests that the model is in its current state perhaps not entirely reflective of the adoption process. The current research suggests that this in part is down to the ego-centric nature of the model, and that it largely ignores the social context of the individual. Furthermore, the current model has only been tested in studies that focus on transport behaviour. There are many other environmentally significant behaviours such as dietary choice and household energy usage that have yet to be tested for their fit to the model, and as such this presents a barrier to its

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generalisability. However, given positive initial findings with regards to the stage related nature of behaviour change (Bamberg, 2013d, Klöckner, 2014), and its potential demonstrated in tailoring more effective behavioural interventions (Bamberg, 2013a), we feel the theoretical model merits further attention for development and testing.

Therefore, for the purposes of this study, the theoretical model will be based upon the stages used in both the TTM and the SSCB as a starting point for investigating the role of social influence across the stages. Vocal critiques have been made of sustainable consumption research that fails to take into account the social contexts of behaviour change (Shove, 2010, Peattie, 2010). Therefore, in order to incorporate the social into behavioural adoption models, the consequences of social influence at the different stages of change must be known. Moreover, if the impact of an individual's social context upon their likelihood to change is known, this provides a platform to investigate not only how to guide individuals through the behaviour change process, but whole social groups through the process. The current formation of these stages of change models is such that (particularly in the case of the TTM) most recommendations are based upon helping a (problem) individual through the stages of change. However, in the case of environmental change, the problems of consumption are not restricted to problem individuals that can be taken through a tailored change program.

The contribution of this thesis.

We suggest that the SSBC model provides a good understanding of the process of individuals adopting sustainable consumer behaviours, and this thesis will add to the growing body of evidence that supports and refines the model itself (Keller et al, 2019). Currently the SSBC elaborates on how moral considerations, attitudes and behavioural control play a role in the process of behaviour change, also the model itself is designed to show how individuals can break out of existing unsustainable behavioural habits. Therefore, whilst we suggest that the SSBC model adequately explains the role of these important motivators of behaviour change, it currently underplays the social influences that are also play a key role in the adoption of sustainable consumer behaviours. We believe that this oversite is important as it abstracts the role of the social contexts all individuals will be going through the process of behaviour change in. Taking the example of meat eating one of the main difficulties recent vegetarians are reported as experiencing a lack of social acceptance and this was a key consideration on their continued abstinence from meat (Niehues & Klockner, 2016). This is just one example of how social influences can make or break lasting sustainable consumer behaviour changes, and yet currently the SSBC model suggests that the only role that they play is through increasing individuals' moral compulsions to act. Evidence of the role of different social norms in relation to behaviour changes suggests that their role is both more pervasive and nuanced than the SSBC model currently suggests and as such is an area where our knowledge can be taken forward.

We take the focus theory of normative conduct (Cialdini, 1990) as our basis for explaining how individuals' perceptions of the world around them motivate them in different ways as they move through the stages of change model (Chapter 2). We then look at how individuals' perceptions of what is socially acceptable behaviour can be

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manipulated to move individuals through the stages of change towards actual lasting behaviour change (Chapter 3). Finally, we take a look at how individuals' perception of the changing dynamics of behaviour around them can also lead to them progressing toward sustainable consumer behaviour changes themselves (Chapter 4). Taken together we aim to provide a comprehensive understanding of how social norms play a role in the stages of change model and suggest ways in which this can be leveraged to create more effective behaviour change campaigns going forward.

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Chapter 2 – Research paper 1 – How do injunctive and descriptive norms guide individuals through the stages of behaviour change?

1.Introduction

Encouraging sustainable consumer behaviours is an important part of combatting environmental problems such as climate change (IPCC, 2014). Sustainable consumer behaviours are understood to be "consumption of products and services, as well as the undertaking of daily activities that minimise their direct and indirect impacts on the environment, whilst simultaneously preserving or boosting individual and collective wellbeing" (Jackson, 2005). Research into interventions that encourage sustainable consumer behaviours is important, as it will give governments and other organisations the tools with which to try and reach their policy objectives for more sustainable consumer behaviours. One of the behaviours with the highest environmental impact is our diet (Popkin, 2009; Stehfest et al, 2009). What food individuals choose to consume can have a large impact on their personal environmental footprint, whilst at the same time there are dietary changes that can be made to significantly reduce that impact (Westhoek et al, 2014). One such change is to reduce meat consumption; research shows that by adopting a low-meat or meat free diet, personal carbon emissions associated with diet can drop significantly (Hallström et al, 2015). This current paper will therefore focus on interventions that can encourage individuals to reduce the amount of meat in their diet. This is in the context of the UK where meat consumption is typically high and so there is much scope for reduction and therefore reduced environmental impacts.

Social norm interventions have become an increasingly popular way to encourage sustainable consumption behaviours due to their relative cost effectiveness (Brent et al, 2013) and persisting impact (Bernedo et al, 2014). Social norm interventions rely on making salient what others are doing (descriptive norms) or what is socially accepted (injunctive norms) to encourage sustainable consumption behaviours (Cialdini et al, 1990). In spite of the popularity of social norms interventions in encouraging sustainable consumer behaviours (e.g., Schultz et al., 2007; Goldstein et al., 2008; Harries et al., 2013; White and Simpson, 2013), a recent meta-analysis shows their effectiveness is only modest compared to other social influence approaches (Abrahamse and Steg, 2013). Therefore, recent research has been focusing on comparing under which circumstances descriptive and injunctive norms are most effective at encouraging sustainable consumption behaviours (White & Simpson, 2013; Jacobson et al, 2011; Melnyk et al 2011; Melnyk et al 2013).

The effectiveness of social norms interventions depends on the relevance of descriptive and injunctive norms in explaining sustainable consumer behaviour (Cialdini et al, 1990; Schultz et al, 2007; Goldstein et al, 2008; Abrahamse & Steg, 2013). Yet there is evidence to show that their relevance in determining behaviour alters as individuals' personal (non-social) factors are providing barriers or encouragement to change. In the present paper we argue, based on recent behaviour change research (Bamberg, 2013; Klockner, 2014), that this relevance might change depending on the stage of change a consumer is at.

The theory of stages of change (Bamberg, 2013) treats behaviour change as a process, composed of several distinct stages. In each stage individuals have different

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barriers that need to be overcome before advancing to the next stage. As such there are several different stages individuals need to be moved through before they will maintain a new sustainable behaviour. Currently the model focuses mainly on individuals' psychological factors that relate to behaviour change, organising them to show which factors are most relevant at particular stages of the behaviour change process. However as yet the model does not consider how specific social norms as used in behaviour change interventions are relevant as an individual moves through the change process.

In this paper, we predict that the relevance of descriptive and injunctive norms depends on the specific stage of behaviour change a consumer is in. As such both types of norms are relevant but act differently on the barriers between stages, thus differentially shaping the process of behaviour change. Therefore, we would expect that the two types of norms will be more or less effective at encouraging movement between different stages of the change process. The present paper will examine and test this assumption by asking:

How do descriptive and injunctive social norms help individuals overcome the barriers to progressing between the different stages of behaviour change?

2. Literature review

Inducing behaviour change, particularly in relation to sustainable consumer behaviours can be very difficult due to the dearth of factors that are known to influence why individuals behave sustainably (see Steg & Vlek, 2009 for an overview of relevant psychological theories). Marketers and policy makers need to know the most effective factors that can be used to effectively change behaviours. When you combine their relative cost effectiveness (Brent et al, 2013) and the potential for long-term behaviour change (Bernedo et al, 2014) social norms interventions can be very useful for behaviour change campaigns.

2.1 The Power of Social Norms In Encouraging Sustainable Consumer Behaviour

Social norms interventions assume that social norms are a key consideration for consumers when changing their behaviour (Cialdini et al, 1990). Social norms are individuals' perceptions about what is common or accepted behaviour in a specific situation and are understood to guide a multitude of social behaviours such as consumption (Cialdini et al, 1990). Social norms have long been accepted as an important influence on behaviour due to significant evidence across numerous contexts (Schultz et al, 2007; Goldstein et al, 2008; De Groot et al, 2013; White & Simpson, 2013). However theoretical refinement of their specific role by Cialdini and colleagues (1990, 1991) showed how relatively small manipulations of social norms in relation to specific behaviours can lead to significant behaviour changes. For example, by providing information leaflets about what the majority of others do; Goldstein, Cialdini & Griskevicius (2008) were able to manipulate the descriptive norm relating to towel usage in hotel rooms. This means that they have become a readily available tool for behaviour change campaigns.

In relation to sustainable consumer behaviours (SCBs), social norms have been found to be an important determinant for behaviours such as conserving household energy

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(Schultz et al, 2007; Allcott, 2011; Göckeritz et al, 2010; Nolan et al, 2008), re-using towels in hotel rooms (Goldstein et al, 2008; Schultz et al, 2008; Bohner & Schluter, 2014), re-using plastic bags (De Groot et al, 2013) and recycling garden waste (White & Simpson, 2013). Thus, social norms are important across a multitude of SCBs and understanding them is key for those interested in encouraging sustainable consumer behaviour.

Social norms are generally distinguished into two distinct categories; the first, descriptive norms are an individual's perception about what is commonly done in a given context (Cialdini et al, 1990; Cialdini et al, 1991). For instance, when visiting a friend's house for the first time you may notice they have their shoes off and so you take your shoes off when entering their house as you perceive it to be the done behaviour in that context. Descriptive norms provide individuals with information about what is an effective behaviour in a given context through providing 'social proof' (Cialdini et al, 1990). The second, injunctive norms are an individual's perception about what is acceptable behaviour in a given context. For instance, upon starting a new job you may notice colleagues given disapproving looks towards another colleague that is eating smelly food in the office, thus your perception will be that eating smelly food is not acceptable in the office context. Injunctive norms are prescriptive in nature and suggest individuals will reap social rewards (or sanctions) if they behave in (or out of) line with the norm (Cialdini & Trost, 1998). Taking this understanding of social norms, descriptive and injunctive norms can be understood to impact on distinct areas of consumer decision-making. Descriptive norms assisting individuals in what is likely to lead to the best outcomes for themselves, whilst injunctive norms fill the role of assisting individuals to understand the social implications of their behaviour. Both of these have been found to be important in explaining SCBs, yet crucially they can often do this in divergent ways (e.g. Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013).

According to the theory of normative conduct (Cialdini et al, 1990), descriptive and injunctive norms need to be made salient or focal in a specific behavioural context to influence SCBs most. They can be made salient in various ways for example through an individual's immediate environment and others in it (Cialdini et al, 1990; Cialdini et al 1991), through the provision of normative messages (Goldstein et al, 2008; De Groot et al, 2013) or comparative behavioural feedback (Schultz et al, 2007; Allcott, 2011). There is therefore plentiful evidence as to how to activate both descriptive and injunctive norms and as such practitioners can relatively easily use them in campaigns to encourage sustainable consumer behaviour. However just being able to activate the norm is one part of an effective behavioural intervention. The norm being activated must be relevant to the individual being targeted and for the desired outcome to be achieved. Yet as descriptive and injunctive norms differ in their explanatory power for SCBs behaviours (Schultz et al, 2007; White and Simpson, 2013; Melnyk et al, 2013), it follows that making one or the other salient will be more effective dependent on the context and target of the behavioural intervention. Researchers have to an extent investigated areas in which descriptive or injunctive norms are more appropriate tools in behaviour change campaigns. For example, Schultz et al (2007) found that making a descriptive norm towards reducing household energy usage salient could actually discourage individuals that were already conserving energy effectively compared to their peers, leading them to increase their energy consumption. They suggested that this is likely due to individuals reverting to the mean, by showing that their neighbours

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consume more than them, they were made to feel that their efforts were irrelevant or unnecessary. Conversely making salient the injunctive norm that low energy users were performing a socially accepted behaviour led low energy users to maintain their socially desirable behaviour as it showed social recognition for their efforts. This suggests the power of injunctive norms to galvanise those who have adopted SCBs and encourage them to continue, whilst simultaneously protecting them against the temptation to relapse that could be caused by unsupportive descriptive norms.

White and Simpson (2013) conducted a study that compared the fit of injunctive and descriptive norms when they were coupled with either the individual or collective level of self being activated. They found that injunctive norms were effective at encouraging sustainable gardening practices when coupled with triggering the collective level of self but not with the individual level of self. Conversely descriptive norms were effective at encouraging behaviour regardless of the level of self they were paired with. This provides further support that injunctive norms are fundamentally social in their focus and can motivate SCBs when there is concern about how their peers will respond. However, descriptive norms can facilitate both social and individual concerns, as when individuals were focussed on personal benefits, descriptive norms could provide them with a guide to what is an effective behaviour, thus providing benefits to the self.

Jacobson et al (2011) found that individuals respond to descriptive and injunctive norms differently depending on the amount of effort they are putting into regulating their own behaviour. If this self-regulatory control is depleted, then individuals are less likely to conform to injunctive norms whilst more likely to conform to descriptive ones. This has potential implications for different behaviour changes that might require more or less self-regulation on behalf of the individual. For example, it could suggest that for the immediate trail of behaviour where there is not much commitment required to carry out behaviour that descriptive norms could be more effective. Whilst for more regular behaviours where effort is required repeatedly in the medium to long term that injunctive norms may be more suitable for supporting this.

Melnyk et al (2013) found that the focus of a campaign (whether it looks to promote or prevent a behaviour) leads to differences in the effect of different norms on behaviour. Using three experiments they found that descriptive norms effectively changed behaviour when promoting a new behaviour, but not so well when the focus was on preventing a specific behaviour. Conversely injunctive norms did not alter in their effect on behaviour whether the focus was on promotion and prevention. What these results show is the heightened impact of descriptive norms in finding a new (alternative) behaviour. Thus whilst injunctive norms may be more suited to highlighting problems with current behaviour. This suggests that there could be interesting applications for using the different types of interventions for first bringing attention to unsustainable behaviours, and then providing viable and sustainable alternatives. This interpretation is somewhat supported by Melnyk et al's (2010) meta-analysis which in a review of 200 papers found that descriptive norms had a bigger impact on encouraging new behaviours whilst injunctive norms had a bigger impact on changing attitudes about existing behaviours.

Not only have intervention studies found differences in social influences acting on individuals, but also at a network level (Iyengar et al, 2015) found differences in how the importance of different social influences alters within the process of a new

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behavioural adoption. Their study focussing on a large-scale network adopting a new medical drug found results consistent with their assertion that informational social influence was important for reducing the risks associated with the new behaviour at the trial stage. Whilst also finding that normative social influence was much more important at increasing repeat behaviour, which they suggest, is due to its ability to make individuals conform to their peers' expectations. Whilst the terminology and methods used in this study are clearly distinct from the others summarised in this literature review. What they appear to be suggesting is that not only to different social norms (i.e., social 'pressures') become more or less important in different situations, but they can vary in importance *within* the behavioural adoption process. The network study undertaken by Iyengar and colleagues only allowed for observational support for these assertions, and as yet the suggestion that different social norms could become more or less important within the process of behavioural adoptions is untested.

The importance of the studies discussed is that not only is it clear that descriptive and injunctive norms operate differently, but that in different conditions each can exert more influence than the other. Knowledge of the conditions where different norms are more effective at influencing behaviour is important to policy makers and social marketers in designing interventions. Moreover, investigating the conditions where either is more effective contributes to social norm theory by elaborating the mechanisms under which social norms are most effective at changing SCBs. However, as yet there has been no research investigating the role of social norms at different stages of the behaviour change process. This is due to the way that existing social norm studies conceptualise behaviour change as an event rather than a process. The results that Iyengar et al (2015) present in their network study suggest that researchers should take into account the process of behaviour change when theorising about social norms, as their research suggests that they operate differently at different stages of the behaviour change process.

2.2. The stage model of self-regulated behaviour change and sustainable consumer behaviour

In the wider research field of behaviour change, investigating change as a process rather than an event has formed a significant line of enquiry (Lewin (field theory reference); Prochaska, 2013). However, until recently theories on the process of behaviour change had not been applied to the context of sustainable consumer behaviours (e.g. Bamberg, 2013; Klockner 2014, Nachreiner et al, 2015). As such there is a limited literature to draw upon when focussing on the process of sustainable consumer changes. Yet there is an emergent tendency towards stage-based models to describe the process within SCBs (Bamberg, 2013). Notable examples of the stage-based approach of behaviour change are the 3-stage approach taken by (Lewin, 1951), the transtheoretical (5 stage) approach taken by (Prochaska et al, 2013) and the 4-stage model used by Bamberg (2013). Of these distinct approaches, the one that has the most empirical support in relation to explaining how individuals adopt sustainable consumer behaviours is Bamberg's stage model of self-regulated behaviour change (SSBC). This model has been found to effectively explain a diversity of SCBs, including the adoption of alternative transportation (Bamberg 2013b) and

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electric vehicles (Klockner, 2014) whilst also applied to explain the adoption of smart meters (Nachreiner et al, 2015).

The SSBC model (Bamberg 2013b) assumes that sustainable behaviour change is a deliberative process regulated by an individual. The deliberative element of the process entails that effort is required on behalf of the individual to move themselves through the stages. This is particularly relevant for when the behaviour being changed is complex and multi-faceted such as is the case with dietary change. Furthermore, many existing attempts to positively change sustainable consumption behaviours have either neglected to measure or struggled to maintain the behaviour changes post intervention. Using the stages of change model means that if successful, interventions can not only increase the enactment of the desired behaviour but also preserve the longevity of the behavioural changes made. This longevity is crucial if behavioural interventions are to have a positive impact in combatting long-term problems of environmental degradation such as climate change.

The four stages of change consist of pre-contemplation, contemplation, action and maintenance (Bamberg, 2013). Pre-contemplation is the stage at which the undesirable (unsustainable) consumer behaviour is stable and resistant to change. Bamberg (2013) suggests that this is due to a lack of awareness that the behaviour is a problem, or where there is awareness that it may be a problem there is still no personal inclination to change. The key to movement from this stage is for an individual to re-evaluate their current problematic behaviour, the transition to the next stage being determined by their formation of a goal to change their current behaviour.

At the contemplation stage the unsustainable behaviour is still prevalent, yet now there is recognition that the behaviour should be changed. Importantly at this stage Bamberg (2013) suggests that though the need for change is recognised, the individual is yet to decide on what specific alternate behaviour should be undertaken to replace the old one. As such at the contemplation stage there are no concrete behaviour change plans, but importantly a willingness to consider change. In order to move on to the next stage of change the task for the individual is to determine an appropriate new behaviour that will facilitate their goal to reduce or eradicate their undesirable behaviour. For example, if their goal is to reduce their meat consumption then to move on from the contemplation stage they must settle on a way of achieving this such as buying goods without meat in, changing where they eat out or finding new recipes.

At the action stage, the lack of clarity over the alternate behaviour is resolved leading to specific behavioural intentions. At this stage individuals are likely to trial the new behaviour, making attempts to phase it into their behavioural routines. At this stage the individual needs to gain familiarity and confidence in their new behaviour in order to repeat it. Bamberg (2013) suggests that becoming familiar and committing to specific situations where the behaviour can be enacted, as well as gaining confidence in their own ability to continue the behaviour can achieve this. For example, by planning specifically to go to shops which stock meat-replacements individuals become familiar with the shop and products over time and as such gain condolence to continue their reduced meat diet.

Finally, the maintenance stage represents the point at which the new sustainable behaviour becomes the new stable state. Stable in the sense that it is regular and

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repeated with resistance to relapsing back to unsustainable behaviours. This is due to the fact that regulatory effort is no longer required to continue the new behaviour, the confidence and experience that come from repeating the new behaviour multiple times reduce the effort required to maintain it and as such individuals are less liable to go back to their previous behaviours. For example, after not eating meat for 6 months it becomes much easier for vegetarians to plan meals without meat due to the fact that they are used to cooking and eating meals without meat.

The empirical evidence for the four distinct stages as described in the SSCB is limited but slowly growing (Bamberg 2013a; Bamberg 2013b; Klockner 2014; Klockner 2017). For example, Bamberg (2013) showed by using a latent cluster analysis that the four distinct stages of change are represented in relation to sustainable transport behaviours. Further support for the 4-stage model is provided in Klöckner (2014), which looked at the adoption of electric vehicles in Norway. Therefore, given the strong and growing proof that sustainable behaviours changes in the longer term happen through this four stage process, we can focus our interventions on the transition points between the stages of change to serve our overall aim of lasting sustainable consumer behaviour changes.

2.3. Tailoring Social Norms to the SSBC Model to Encourage SCBs

In order to generate movement through the stages Bamberg (2013) suggests that individuals have to overcome different barriers. This means that through providing stimuli that assists in overcoming these barriers, interventions can assist in progressing individuals through the stage of change. Crucially, Bamberg's (2013b) intervention study using the SSBC model suggests that interventions that are tailored to specific stages are more effective at progressing individuals through the stages of change than homogeneous campaigns. However, whilst this is a promising result for the efficacy of stage based interventions, there is as yet a lack of research exploring existing interventions strategies may be adapted to work within the stage based approach. More specifically, as social norm interventions are shown to be a popular and successful way to encourage SCBs (Schultz et al, 2007; Goldstein et al, 2008 ; Brent et al, 2013), it is relevant to investigate to what extent injunctive and descriptive norms are relevant through the different stages of behaviour change.

2.4. How do social norms move individuals through the stages of change?

Past research shows that descriptive and injunctive norms differ in their importance to change SCBs in different scenarios for different individuals (e.g., White & Simpson, 2013; Jacobson et al 2011; Melnyk et al 2013). As such it can be difficult for social marketers to know when to use descriptive or injunctive norms (or a combination) for their social marketing campaigns to encourage or discourage specific (un)desired behaviours. Furthermore, in relation to the adoption of complex SCBs such as sustainable dietary behaviours it is likely that consumers go through a process of distinct stages, requiring effortful self-regulation on behalf of individuals in order to achieve lasting behaviour change (cf. Bamberg, 2013; Klöckner, 2014). This means that there is a framework that tells us how individuals can be moved through the stages of change in order to successfully encourage long term behaviour change. Yet in spite of the social norms literature suggesting that different norms become more or less relevant through the process of behavioural adoption (Iyengar et al, 2015), as yet the

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specific relevance of social norms within a process model of behaviour change (such as the SSBC) is unknown. Therefore, we do not currently know how to use social norms to effectively encourage individuals through the stages of change to achieve long term behaviour change in complex behavioural contexts such as our diet. Present research suggests that social norms become more or less relevant depending on the stage of change an individual is at. Therefore, reconciling this gap in the knowledge would expand our understanding of how social norms, more specifically injunctive and descriptive norms, operate in relation to encouraging the adoption of SBCs.

The prescriptive nature of injunctive norms suggests a dual role in terms of advancing individuals through the stages of change. This is drawn from existing research on injunctive norms, which suggests two key roles towards behaviour change. The first role of injunctive norms is that they can both cause an individual to re-evaluate their current behaviour (e.g. Melnyk et al 2011; Melnyk et al 2013), as well as galvanising those already positively pre-disposed to a positive SCB to continue or maintain it (e.g. Schultz et al 2007; Iyengar et al 2015). The re-evaluation of current behaviour is the key task according to Bamberg (2013) for movement from the pre-contemplation to contemplation stage. This puts what is the main task required for stage movement between those stages.

The second role of injunctive norms is to reinforce the positive social outcomes associated with sustainable consumer behaviour. For example, in Schultz et al's (2007) study it was found that providing injunctive norm messages prevented individuals who had lower than average water usage from regressing to the (higher usage) mean. This role will be important when the task for moving from the action to maintenance stages which is to boost the confidence of those individuals undertaking a new behaviour. Injunctive norms have been shown to have a galvanising effect on SCBs (Schultz et al 2007). As such they would be expected to signal social support and thus boost the confidence of those undertaking unfamiliar behaviours. This suggests a significant role of injunctive norms at two distinct stage movements. 1) From pre-contemplation to contemplation where their ability to encourage individuals to re-evaluate their current behaviour should be key (Melnyk et al 2011, Bamberg 2013). 2) From action to maintenance, where their ability to help mitigate social uncertainty arising from a recent behaviour change is key to encouraging individuals to stick with the new SCB (Schultz et al 2007; Iyengar et al 2015).

Descriptive norms are thought to influence behaviour mainly through their ability to promote effective/adaptive behaviour (e.g. White & Simpson 2013; Melnyk et al 2013; Iyengar et al 2015). They are therefore likely to be more effective for the transition from contemplation to action where the abstract sense of a need for change is translated into concrete actions. This is due to the need for an individual to choose an effective alternative (sustainable) behaviour in order to make the transition to the action stage.

In discussing the differing expected effects of descriptive and injunctive norms at the different stages of change, it is important to also acknowledge the overlap between the two. For example, previous research has suggested that individuals can infer the prevalence of an injunctive norm through a descriptive norm being made salient and vice versa (Keizer et al, 2008). This would suggest that in all the stage transitions we might expect both types of social norm interventions to be somewhat effective at

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progressing through the stages of change. However, given their varying suitability we would also expect that INs versus DNs interventions would be effective to a different extent at different stages. That is, both descriptive and injunctive normative interventions will be effective at moving individuals from pre-contemplation to contemplation, but injunctive norms are likely to be more effective than descriptive norms for this particular stage movement.

H1: Injunctive normative messages will be more effective than descriptive normative messages and information only at getting individuals to form goal intentions to reduce their meat consumption.

H2: Descriptive normative messages will be more effective than injunctive normative messages and information only at getting individuals to form behavioural intentions to reduce their meat consumption.

H3: Injunctive normative messages will be more effective than descriptive normative messages and information only at getting individuals in the action stage of change to form implementation intentions to reduce their meat consumption.

H4: Injunctive norms will be a stronger predictor of a) goal intentions and b) implementation intentions to reduce meat consumption than descriptive norms.

H5: Descriptive norms will be a stronger predictor of behavioural intentions to reduce meat consumption than injunctive norms.

The contribution of this paper is twofold. First, in relation to the adoption of complex SCBs such as sustainable dietary behaviours it is likely that consumers go through a process of distinct stages, requiring effortful self-regulation on behalf of individuals in order to achieve lasting behaviour change (Bamberg, 2013; Klöckner, 2017). Although there is a framework that tells us how individuals can be moved through the stages of change in order to successfully encourage long term behaviour change, there is little knowledge on how social norms can be integrated in this existing framework when we distinguish between descriptive and injunctive norms. Knowing how social norms theories can be integrated within the stages of change model will provide important insights on how we can use social normative messages to effectively change complex behaviours such as reducing meat consumption. Our first contribution is therefore to integrate two important but independent fields of research, which will help both scholars and practitioners in the field of behaviour change interventions.

Second, the SSBC model has only been applied in a limited number of behavioural contexts. Reducing meat consumption generally as a specific research context is yet to be studied in relation to this model and yet is one of the most environmentally impactful behaviours an individual can change. Therefore, our second contribution is to provide evidence into the validity of the stage model in an as yet untested yet important context.

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Method

Participants & Design

387 participants were recruited in a convenience sample through social media and survey sharing websites targeting UK residents to undertake a study related to their current diet. Initial eligibility criteria were 18 years of age or older, a current UK resident and consumers of meat. An additional screening measure was the stage of change measure used to determine current stage of behaviour change (Bamberg, 2013), with those currently 'maintaining' a meat reducing diet also excluded from the remainder of the study, as they would already be enacting the behaviour the study is targeting for change. Furthermore, attention checks were used as a quality control and those who did not pass the checks were removed from the final sample for analysis. This left a final sample for analysis of 159 participants of which the key demographics are shown in Table 1. As can be seen from the demographics due to the nature of the sampling approach it is not representative of the UK population as a whole and is significantly biased towards younger female participants with a University education (ONS, 2018).

The design was a one way between subjects experimental design with three levels, looking at the impact the three different levels of Social norm interventions (Injunctive norm v Descriptive norm v Information only), on goal, behavioural and implementation intentions towards reducing meat consumption. The between subjects factor was the randomised social norm intervention given to the participants and the dependent variables were the goal, behavioural and implementation intention measures.

Procedure

Demographics and SSBC measures

The data was collected between June and December 2018 through Qualtrics survey hosting (www.qualtrics.com). Once the participants clicked on the advertised survey link, they were all taken to the same Qualtrics hosted survey page. Participants were firstly made aware that they were taking part in a study looking at their diet and attitudes towards diet and asked to consent to participate. After answering demographic questions, participants were given a stage of change measure to assess their current stage of change adapted from Bamberg (2013). This is followed by measurement of the other psychological variables included in the SSBC model using 7-point scales (Bamberg, 2013).

Intervention treatments

Following this standardised part of the study the participants were randomly allocated to one of three interventions presenting information only, or information designed to make the descriptive or injunctive norm toward reducing meat consumption salient are shown in appendix 1.

The interventions utilised fabricated statistics about what is acceptable or done in relation to meat consumption in the UK. Respondents were made aware of this deception in the study debrief. The manipulation of descriptive and injunctive norms was checked with 2 items for each norm type: {descriptive norm items – 1. What is

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your understanding of the number of people that are trying to reduce their meat consumption in the UK? (Large majority – small minority); 2. Do you think that most people in the UK are considering or trying to eat environmentally friendly diets such as the 'flexitarian' diet? (strongly agree – strongly disagree)}. Injunctive norm items – 1. Please indicate the extent to which you agree with the following statement: {People in the UK think that reducing the amount of meat we eat is the right thing to do. (strongly agree-strongly disagree); 2. Do you think that people in the UK approve of meat reducing diets such as flexitarianism? (strongly agree-strongly disagree)}.

Goal, behavioural and implementation intentions.

Finally, participants were asked about their (goal, behavioural and implementation) intentions to reduce their meat consumption using items adapted from Klockner (2017). Goal intention was measured using 2 items with 7-point scales (Please indicate the extent to which you agree with the following statements: 1, I intend to eat less meat in the near future; 2, I will make an effort to eat less meat in the future). Behavioural intentions were measured with 6 items in total looking to encapsulate the different behavioural strategies for reducing meat consumption as outlined in Klockner (2017), 2 items measuring behavioural intentions to reduce meat portion sizes (Please indicate the extent to which you agree with the following statements: 1. I intend to reduce the size of my portions when I eat meat; 2. I will eat smaller portions of meat in the near future), 2 items measuring behavioural intentions to switch meat items for other ingredients (1. I will switch the meat in some meals for a different protein source (e.g. fish) in the near future; 2. I will make an effort to eat different forms of protein instead of meat) and 2 items measuring behavioural intentions to eat more vegetarian meals (1. I will eat more vegetarian meals; 2. I will make an effort to eat more vegetarian meals in the near future). Implementation intentions were measured using 3 items; one item to measure participants' intentions to implement the behavioural intention strategies outlined in the behavioural intention measures. One item measuring intent to implement a plan to eat smaller portions of meat, one item measuring intent to implement a plan to eat different forms of protein to meat and one item measuring intent to implement a plan to eat more vegetarian meals (reducing – I have a specific meal in mind where I will reduce the amount of meat in the dish; replacing - I have a specific meal in mind where I will replace the meat in the dish.; vegetarian - I have a specific vegetarian meal in mind that I will eat in the near future).

Data analysis

The data will be sorted and analysed using SPSS, downloaded directly from the qualtrics platform. The analysis will be split into two key parts; firstly a one-way MANOVA will be used to assess the effect of the different interventions on the different intention types (Hypotheses 1 to 3). Secondly a multiple regression analysis will look at the association between the measured injunctive and descriptive norms and the different intention types (Hypotheses 4a, 4b, 5a & 5b).

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Results:

Descriptive statistics

Of 159 participants included in the final analysis, 59 were given the injunctive norm intervention, 48 were given the descriptive norm intervention and 52 were given information only. Though random allocation with an equal weighting was used for assignment to the intervention treatment, due to dropout and exclusions the final groups are slightly unequal. Preliminary analysis showed that 90 participants were in the pre-contemplation stage of change, 29 in the contemplation stage of change and 40 in the action stage of change. This indicates the sample contained a majority of participants that have not yet attempted a meat reducing behaviour.

Discriminant validity

A principal component analysis was conducted on the dependent variables in the study in order to determine discriminant validity, following the procedure set out by (Hair et al, 2019). We identified the factor loadings for each of the measurement items to each of the three factors being used as dependent variables. In order to identify potential cross loading of items we squared the factor loadings in order to account for each variable's variance. We then compared the ratio of each factors largest to second largest squared loading in order to determine whether there were cross loading problems. The second goal intention measure had a ratio of less than 1.5 and therefore was deemed to have problematic cross-loading and therefore removed from the goal intention factor. Also, the 2 items measuring behavioural intentions to reduce portion sizes did not adequately load onto the behavioural intention factor and therefore were excluded from the final behavioural intention measure. In making these adjustments for cross loading, discriminant validity has been established and therefore the hypothesis testing can go ahead using the distinguished goal, behavioural and implementation intentions.

Scale validity

All three dependant variables were measured with scales that showed strong internal consistency after being modified according to the adjustments made to establish discriminant validity. Goal intention to reduce meat consumption is now measured using a single item and so scale validity does not apply. Behavioural intention to reduce meat consumption (4 items, Alpha = 0.911). Implementation intentions to enact a meat reducing behaviour (3 items, Alpha = 0.860). Therefore, we moved ahead to analyse the data using the dependent variables as described here.

Intervention check

An intervention check was used to check whether the interventions resulted in a significant difference in the measured descriptive and injunctive social norms.
Both injunctive and descriptive norms were measured using 2 items each with 7-point likert style scales (IN: 1. Please indicate the extent to which you agree with the following statement: People in the UK think that reducing the amount of meat we eat is the right thing to do. 2. Do you think that people in the UK approve of meat reducing

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diets such as flexitarianism?), (DN 1. What is your understanding of the number of people that are trying to reduce their meat consumption in the UK? 2. Do you think that most people in the UK are considering or trying to eat environmentally friendly diets such as the 'flexitarian' diet?). Both scales showed strong internal consistency – (IN: 2 items, Alpha = 0.809), (DN: 2 items, Alpha = 0.820).

The check showed that the injunctive norm manipulation resulted in stronger Injunctive and Descriptive norm measures, so that whilst the descriptive norm manipulation was effective in manipulating the descriptive norm, the injunctive norm manipulation was actually more effective at doing so. Both norm manipulations resulted in stronger measured descriptive and injunctive norms than in the information only group (See table 1 for full means and standard deviations).

Table 1. Descriptive statistics showing the effect of intervention type on injunctive & descriptive norms (Manipulation check)

*Norm check & **Intervention given***	*N*	*Mean*	S.D
*Injunctive norm measure/**Info only intervention***	52	3.635	1.432
*Injunctive norm measure/**Descriptive norm only intervention***	48	2.927	1.477
*Injunctive norm measure/**Injunctive norm intervention***	59	2.619	1.340
*Descriptive norm measure/**Info only intervention***	52	4.279	1.373
*Descriptive norm measure/**Descriptive norm only intervention***	48	3.448	1.544
*Descriptive norm measure/**Injunctive norm intervention***	59	3.271	1.261

**Scales from 1 – 7 where 1 shows strongest positive perception of with the norm and 7 is the strongest negative perception of the norm. E.g. an answer of 1 to the injunctive norm measure would mean that individuals strongly agree that others think eating less meat is the right thing to do.*

A one-way ANOVA was used to test that the differences in the measured norms between interventions was significant. The results showed that the differences between the interventions presented had a significant impact on the Injunctive norm measure, $F(2, 156) = 7.386$, $p = 0.001$ and also the descriptive norm measure $F(2, 156) = 8.044$, $p < 0.001$. We can therefore conclude that the interventions did successfully manipulate both the descriptive and injunctive norms but that the injunctive norm manipulation was more effective in both cases, which was not expected.

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Effectiveness of normative interventions on intentions to reduce meat consumption

A one-way MANOVA was used to test if participants given either injunctive or descriptive norm messages or information only messages resulted in significantly different goal, behavioural and implementation intentions to reduce their meat consumption. Firstly, the assumptions that render a one-way MANOVA appropriate in this analysis were checked. The majority of the data was not normally distributed, as assessed by the Shapiro-Wilk test ($p < 0.05$). There were no univariate or multivariate outliers in the data as assessed by checking the boxplots. There were linear relationships as assessed by scatterplot and no multicollinearity: (Goal intention and Behavioural intention $r = 0.815$, $p < 0.001$, Goal intention and Implementation intention $r = 0.585$, $p < 0.001$, Behavioural intention and Implementation intention $r = 0.621$, $p < 0.001$). Using Box's M test revealed that there was not homogeneity of the variance-covariance matrices ($p = 0.675$), which is expected given the data, is non-normally distributed. There was homogeneity of variance as tested by Levene's test of homogeneity of variance ($P > 0.05$).

As a one-way MANOVA is fairly robust to violations of the assumption of normality, we decided to run this analysis in spite of the non-normal distribution of our dependent variables and non-homogeneity of the variance-covariance matrices. Three types of intention were assessed in relation to reducing meat consumption; goal, behavioural and implementation. Intention types were measured from 1 to 7 where 1 shows the strongest and 7 the weakest intention. Those in the Injunctive norm group showed the strongest goal intention (mean = 3.31, s.d. = 1.82), followed by the information only group (mean = 3.46, s.d. = 1.71) and the descriptive norm group showed the weakest goal intention (mean = 3.77, s.d. = 1.74). For behavioural intentions to reduce meat consumption, the same pattern occurred with the injunctive norm group showing the strongest behavioural intention (mean = 2.83, s.d. = 1.46), followed by the information only group (mean = 3.20, s.d. = 0.62) and the descriptive norm group showed the weakest behavioural intention (mean = 3.29, s.d. = 1.46). The same pattern was again found with regards to implementation intentions to reduce meat consumption. The injunctive norm group showed the strongest implementation intentions to carry out plans that would reduce their meat consumption (mean = 3.72, s.d. = 1.83), followed by the information only group (mean = 3.85, s.d. = 1.65) and again leaving the descriptive norm group with the weakest implementation intentions (mean = 3.96, s.d. = .1.58). The difference between the interventions given on the three intention types was not statistically significant $F(6, 308) = 0.664$, $p = 0.679$; Wilks' $\Lambda = 0.975$; partial $\eta 2 = 0.013$.

As our dependent variables were non-normally distributed, we checked these results by using an equivalent non-parametric test. The Kruskal-Wallace test tests the assumption that the distribution of the dependent variable is the same across the different experimental groups. Therefore, a significant result would indicate that the distribution of the intention types was significantly different between the intervention groups. The results of the independent samples Kruskal-Wallace test affirmed the null hypotheses that the distribution of goal intention scores was the same across the different intervention groups ($p = 0.367$), the distribution of behavioural intention scores was the same across different intervention groups ($p = 0.095$) and the

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distribution of implementation intention scores was the same across intervention groups (p = 0.658).

Therefore, we cannot discount the null hypotheses for H1, H2 & H3 as both parametric and non-parametric tests did not find significant results. However, there is a clear pattern in the results that the injunctive norm intervention led to the strongest intentions for all three intention types we will further investigate this relationship with a multiple regression analysis.

Predictive power of descriptive and injunctive norms on intentions to reduce meat consumption

Multiple regression analysis was used to test if descriptive and injunctive norms significantly predicted participants' goal, behavioural and implementation intentions to reduce their meat consumption. Firstly, we checked whether the data fit the assumptions for a multiple regression to be valid. There was approximate linearity as assessed by partial regression plots on each of the goal, behavioural and implementation intention models. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.791 for the goal intention model, 2.086 for the behavioural intention model and 1.928 for the implementation intention model. There was homoscedasticity assessed by inspection of the studentized residuals versus unstandardized predicted values on each of the goal, behavioural and implementation intention models. There was no evidence of multicollinearity as tolerance values were greater than 0.1 on each of the goal, behavioural and implementation intention models.

The results of the analysis indicated that the two predictors model significantly predicted goal intentions $F(2,156) = 7.595$, $p < 0.001$, adj $R^2 = 0.077$. However, it was found that only injunctive norms significantly predicted goal intentions (beta=0.272, p=0.013) whereas descriptive norms did not (beta=0.035, p = 0.751).
The behavioural intentions model showed that the two predictors significantly predicted behavioural intentions $F(2,156) = 10.999$, $p < 0.001$, adj $R^2 = 0.112$. Similarly, to the goal intentions model, only injunctive norms were a significant predictor in the model (beta = 0.266, p = 0.014) whereas descriptive norms were not (beta = 0.108, p = 0.312).
The implementation intentions model showed that the two predictors significantly predicted implementation intentions $F(2, 156) = 4.977$, $p = 0.008$, adj $R^2 = 0.048$. Again, injunctive norms were a significant predictor in the model (beta = 0.302, p = 0.007) and descriptive norms were not (beta = -0.93, p = 0.403).

The multiple regression results confirm our predictions made in H4a & H4b as injunctive norms were significant predictors for goal and implementation intentions to reduce meat consumption whereas descriptive norms were not. However, the prediction made in H5 was not borne by the evidence, as descriptive norms were not a significant predictor of behavioural intentions to reduce meat consumption whereas injunctive norms were.

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Discussion

General discussion

The results of this study were in the most part not consistent with our predictions derived from social norm theory (Cialdini et al, 1991) and the stage model of self-regulated behaviour change (Bamberg, 2013). Providing participants with injunctive and descriptive norm messages did not lead to significantly higher goal, behavioural or implementation intentions towards reducing their meat consumption. In spite of this there was a recurring pattern with the injunctive norm message leading to stronger goal, behavioural and implementation intentions than the descriptive norm message. A multiple regression analysis then determined that the measured injunctive norms of individuals were a significant predictor of all three intention types but were a more significant predictor of goal and behavioural intentions than they were on implementation intentions. Our stated aim was to assess: *How do descriptive and injunctive social norms help individuals overcome the barriers to progressing between the different stages of behaviour change?* Our results to shed some light on this by showing that injunctive norms have an important explanatory role in overcoming the barriers between each of the stages, however we were not able to show that an injunctive norm intervention was able to yield a supporting result to a significant level. Here we discuss the theoretical implications of these findings.

Theoretical implications

The current research makes a theoretical contribution to the literature by highlighting the role that injunctive social norms play throughout the different stages of behaviour change. The existing SSBC model (Bamberg, 2013) did not include an important theoretical refinement of norms by not distinguishing between descriptive and injunctive norms (Cialdini, 1991), we suggest this is an important oversight due to the different way in which the different types of norm drive behaviour change e.g. (Schultz et al, 2007; Melnyk, 2011). By making this distinction we have found that not only are injunctive social norms important at the beginning of the behaviour change process (by predicting goal intentions to change existing behaviour as they were depicted in the existing model), but throughout the stages of change as they are also significant predictors of behavioural and implementation intentions which signify transitions in the latter stages of the behaviour change process. It has already been demonstrated that injunctive norms can prevent a 'boomerang effect' whereby unsupportive descriptive norms can lead to a reduction in SCB's. However, by providing a supportive injunctive norm, individuals are more likely to maintain their SCB (Schultz et al, 2007). Our findings suggest that due to their explanatory power at the latter stages of the SSBC model, injunctive norms may also be playing an active role in increasing individuals SCB's rather than just counteracting the negative effects of an unsupportive descriptive norm.

Contrary to our expectations we did not find supporting evidence that the descriptive norm was an important factor in predicting the intentions that move individuals through the stages of change. We posit two potential explanations for this in the existing norm theory. Firstly, it is known that the reference group for the descriptive norm has a significant impact on how effective that norm is at changing behaviour (Goldstein et al, 2008). This is relevant to our study as due to the way in which we recruited our

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sample we had to use a very general reference group for both our norm interventions and measures (UK population). It could be that the lack of a significant effect could partly attributed to our participants not strongly identifying with the norm reference groups used. Secondly it has been previously shown that normative influence is under detected (Nolan et al, 2008), that is to say that individuals rate social norms as an unimportant factor in their behaviours when in fact they have a big impact on how they actually behave. In this study due to the nature of the SSBC we focussed on goal, behavioural and implementation intentions to reduce meat consumption due to their significance in moving towards lasting behaviour change. However, the dependent measures were intentions rather than actual behaviours and it is potentially the case that whilst normative interventions may have led to behaviour change, they play less of a role when individuals are making effort to self-regulate their behaviour as the SSBC is measuring. It could therefore be the case that due to the different intention types forming part of a change process that requires effortful self-regulation that descriptive and injunctive norms will not directly trigger the different intention types as individuals do not perceive norms to be important factors in their decisions upon self-reflection.

The distinction between the effects found here of injunctive and descriptive norms on the different intention types that guide transitions through the SSBC shows a clear argument for adding theoretical refinement to how social norms are currently conceptualised within the model. However, in the present paper we were unable to find statistically significant evidence that showed the effect of normative interventions on the same intention types. There was however a clear pattern here also in that injunctive norm interventions led to stronger goal, behavioural and implementation intentions than both a descriptive norm intervention and an information only group. Therefore, we feel due to the limitations of the current design in assessing their effectiveness that further research should explore this trend to see if there are significant relationships there that could further our understanding.

The current research has also added to a body of research on the differences between injunctive and descriptive norms in the way that they impact on SCBs (Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013). Injunctive norms have been shown to be important predictors in a model of self-regulated behaviour change whereas descriptive norms have not. This suggests that injunctive norms have a more important role to play where an individual is going through a comprehensive revaluation of their behaviour, which would be expected when making complex and lasting changes to behaviour such as in the context of diet. However, we cannot deny the existing evidence in the literature that descriptive norms can be an important predictor of behaviour change, but the current research does suggest their limitations when it comes to specific types of sustainable behaviour such as dietary change as shown in the current paper.

Sustainability marketing implications

The current research contributes to the practice of sustainability marketing by shedding further light on which tools should be used for which behaviour change campaigns. In trying to induce sustainable consumer behaviours, sustainability marketers must consider what is the most appropriate way to reach their target audience and what will result in the most effective behaviour change. The current

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research suggests that the likely process of behaviour change related to the target behaviour is important in understanding which sustainability marketing tools will be best suited to changing the behaviour. One thing to consider is whether the behaviour time/context specific, for example making a single choice to order a vegetarian meal off a menu instead of a meat option. In this case there are seemingly different triggers that would be best to encourage that one off behaviour than there are if the target is to reduce a consumer's overall meat consumption in the longer term. In this instance the current research would suggest that highlighting the social approval related to making these long-term changes is likely a more effective strategy than simply making consumers aware of what others are doing.

Directions for future research

In addition to its contributions the current research also brings forth many more unanswered questions in the understanding of social norms and their role in encouraging sustainable consumer behaviours. For example, whilst injunctive norms were found as significant predictors to the three intention types, the lack of significant results in the experimental element of the paper left it unclear if injunctive norm interventions alone could be enough to trigger movement between the stages and thus longer-term behaviour changes. Furthermore, the lack of behavioural measurement in the current study means that at present we are unable to link the role of injunctive norms in the SSBC model to actual behaviour change. Therefore, future research could look to address these concerns by testing how injunctive norm interventions impact on movement through the SSBC model over time and links to actual behaviour change.

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Appendices:

Appendix 1: Intervention scripts

Descriptive norm: Animal livestock counts for 18% of total greenhouse gas emissions. By eating less meat, it is possible to significantly reduce the emissions from our food system. Replacing meat with plant-based alternatives just a few days a week could reduce your environmental impact whilst simultaneously providing health benefits.

Meat reducing diets such as the 'flexitarian' diet are very popular in the UK public according to a recent survey**. A majority of people surveyed are trying to or considering reducing their meat consumption**; 78% of people surveyed agreed that they try to eat environmentally friendly diets with 64% trying or considering of meat reducing diets as a way to be healthier and more environmentally friendly.

So why not join all the others and make plans to reduce the amount of meat that you eat today?

Injunctive norm: Animal livestock counts for 18% of total greenhouse gas emissions. By eating less meat, it is possible to significantly reduce the emissions from our food system. Replacing meat with plant-based alternatives just a few days a week could reduce your environmental impact whilst simultaneously providing health benefits.

Meat reducing diets such as the 'flexitarian' diet are strongly supported by the UK public according to a recent survey. **A majority of people surveyed approved of reducing the overall levels of meat consumption in the UK**; 78% of people surveyed agreed that environmentally friendly diets should be adopted with 64% approving of meat reducing diets as a way to be healthier and more environmentally friendly.

So why not see what all the positivity is about and make plans to reduce the amount of meat that you eat today?

Information only: Animal livestock counts for 18% of total greenhouse gas emissions. By eating less meat, it is possible to significantly reduce the emissions from our food system. Replacing meat with plant-based alternatives just a few days a week could reduce your environmental impact whilst simultaneously providing health benefits.

Meat reducing diets such as the 'flexitarian' diet are a way of eating less meat without having to give it up.

So why not make plans to reduce the amount of meat that you eat today?

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Appendix 2: Stage of change measure:

Which statement best describes how you feel about the level of meat that you currently eat?

1. At the moment I eat meat most meals and am happy with this level of consumption, I see no reason why I should reduce it. (Pre-contemplation stage)
2. At the moment I eat meat most meals. I would like to reduce the amount of meat that I eat but I feel that I would be unable to do so. (Pre-contemplation stage)
3. At the moment I eat meat in most of my meals. I am currently thinking about reducing the amount of meat that I eat, but I am unsure about how I would replace it in my diet. (Contemplation stage)
4. At the moment I eat meat in most of my meals, but I aim to reduce the level of meat that I eat. I know how I would like to replace the meat content in my diet but as yet I haven't done this regularly, though I have tried several alternatives. (Action stage)
5. I have already reduced the amount of meat in my diet and I aim to continue doing so. (Maintenance stage)
6. Because of health or other concerns I am unable to change my current diet. (Captives)

Appendix 3: (descriptive statistics)

Please indicate your sex.

		Frequency	Percent
Valid	Male	42	25.8
	Female	121	74.2
	Total	163	100.0

How many people currently live in your household? (including you).

		Frequency	Percent
Valid	1 (I live alone)	37	22.7
	2	46	28.2
	3	25	15.3
	4	30	18.4
	5	19	11.7
	6+	6	3.7
	Total	163	100.0

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What is your current household income (per year)?

		Frequency	Percent
Valid	less than £10,000	46	28.2
	£10,001 - £20,000	29	17.8
	£20,001 - £30,000	22	13.5
	£30,001 - £40,000	17	10.4
	£40,001 - £50,000	17	10.4
	£50,001 - £75,000	12	7.4
	£75,001 - £100,000	11	6.7
	£100,001 - £150,000	3	1.8
	£150,001 - £200,000	4	2.5
	More than £200,000	2	1.2
	Total	163	100.0

Which option best describes your current employment status?

		Frequency	Percent
Valid	Employed (full time)	28	17.2
	Employed (part time)	28	17.2
	Self-employed	7	4.3
	Full time study	85	52.1
	Unemployed	5	3.1
	Other (please specify)	10	6.1
	Total	163	100.0

What is your highest level of qualification from the following options?

		Frequency	Percent
Valid	Secondary school qualifications (e.g. GCSE, O-level)	6	3.7
	A level (or equivalents)	9	5.5
	Bachelors degree	70	42.9
	Masters degree	69	42.3
	Doctoral degree	7	4.3
	Other (please specify)	2	1.2
	Total	163	100.0

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Chapter 3 – Research paper 2: How do injunctive norms encourage individuals to reduce their meat consumption?

Introduction

Social norms as effective interventions to encourage sustainable consumer behaviours

There is already much evidence that shows injunctive social norms can be effectively used to encourage sustainable consumer behaviours (Cialdini, 1990; Schultz et al, 2007; De Groot et al, 2013). Not only have they been shown to encourage individuals to take up sustainable consumer behaviours, but also, they are effective at getting individuals to carry on enacting these sustainable consumer behaviours when they perceive the majority around them are not (Schultz et al, 2007). The already amassed evidence would seem to suggest that injunctive norms then would be an appropriate tool to encourage long-term sustainable consumer behaviours such as adopting a low meat diet. However, there has been little research as which explains the role that they play in longer-term behaviour changes. As such it is not yet clear when injunctive norms can or should be deployed for most effect in campaigns aimed at long term complex sustainable consumer behaviour changes such as dietary change. The current paper looks to address this gap in the literature by undertaking a longitudinal experiment to see the impact that an injunctive social norm based social marketing intervention has on individuals moving through a self-regulated process of behaviour change towards adopting a complex, repeated sustainable consumer behaviour (adopting a meat reducing diet).

The environmental case for reducing meat consumption in the UK

Reducing meat consumption has a multitude of environmental benefits, from reducing greenhouse gas emissions to lowering freshwater usage and putting less strain on the land resources required for food production (Westhoek et al, 2014). The nature of our diet dictates that it is longer term changes which are required to make substantial impact on food productions environmental impact. Whilst there are undoubtably substantial changes that can be made on the production side that would have environmental benefits (e.g. Herrero et al, 2010; Schroeder et al, 2013), the current research focuses on consumption side solutions to the environmental problems. This research bases itself on a key behavioural assumption that reducing overall meat consumption will have environmental benefits. We base our assumptions on a strong consensus within those fields that reducing overall meat consumption (particularly in high meat consuming western societies such as the UK), creates a net benefit to the environment (Carlsson-Kanyama & Gonzalez, 2009; Westhoek et al, 2014). Therefore, it is a justifiably strong target behaviour for behaviour change interventions looking to encourage more sustainable consumption behaviours. This study takes place in the UK where average meat consumption is 81.48kg per person per year (2013 figures) or approximately 1.6kg per person per week (Ritchie & Roser, 2017), this puts the UK as a high meat consumer on the world stage and as such an ideal target audience for an intervention study.

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Literature review

Why injunctive norms are likely to be effective interventions for encouraging individuals to reduce their meat consumption.

Injunctive norms are defined as an individual's perception of what other people deem an acceptable behaviour in a particular context (Cialdini et al, 1990; Cialdini et al, 1991). Injunctive norms influence behaviour by playing on an individual's desire to fit in or to look good in a social setting. For example, if you were to have dinner with friends that are environmental activists, you may choose to have a sustainable/organic meal so as to comply with what you perceive they think is acceptable behaviour in that context, whereas were you alone or with different friends, you may not make the same choice. Injunctive norms however have shown to be powerful levers for behaviour change beyond very specific contexts like the example given above, for example encouraging continued energy conservation (Schultz et al, 2007). Given that they can have an important role in determining behaviour, Injunctive norms can be manipulated and leveraged in social marketing interventions to encourage sustainable consumer behaviours (e.g. Schultz et al, 2007, Goldstein et al, 2008; Jacobson et al, 2011; De Groot et al, 2013). For example, encouraging individuals to buy sustainable products (Melnyk et al, 2013) or reduce the number of plastic bags they use when shopping (De Groot et al, 2013).

Of particular interest to this study is that injunctive norms have been shown to be effective at reinforcing sustainable consumer behaviour changes when the majority of people are not doing the same. For example, in Schultz's (2007) study they found that low energy users would increase their energy consumption when presented with data about the rest of their neighbourhood consuming more than them, they reverted to the mean. However, when this same data was presented combined with an injunctive norm manipulation which supported their current low energy usage, they maintained their current sustainable consumption behaviour in spite of those around them not doing the same. This shows that injunctive norms can be powerful levers to help individuals maintain sustainable consumer behaviours when they are in a minority of people already doing so. The theory suggests that the reason for injunctive norms being effective at encouraging the maintenance of sustainable consumer behaviours is that they signpost to an individual the social approval of their current behaviour. Where the individual is approving social benefits by enacting the sustainable consumer behaviour, they are reinvigorated to continue the behaviour when what the majority of people are doing around them might suggest it to be insignificant or in vein.

It is this dual role of injunctive norms that we believe is key to their ability to encourage longer term behaviour changes. Not only do they highlight and encourage behaviours in the first place when an individual isn't already acting in line with the norm, but they then also act as positive reinforcement when an individual has already started enacting a difficult new sustainable consumer behaviour. However, to fully understand where injunctive norms are specifically playing a role in the process of behaviour change, we will look to integrate them into a formalised theory of the process of sustainable consumer behaviour changes, Bamberg's (2013) stage model of self-regulated behaviour change (SSBC).

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How the stages of change model accurately depict longer-term changes in meat consumption.

Bamberg's (2013) stage model of self-regulated behaviour change (SSBC) depicts changes in sustainable consumer behaviours as a process of four distinct stages of change. The models aim is to depict how the behaviour change process evolves over time, what are the key transition points in the behaviour change process and the key factors that drive the behaviour change. The SSBC model assumes that individuals engage in effortful self-regulation in order to change their behaviours, in other words, significant cognitive effort is required of an individual in order to make significant and lasting changes to their behaviour. This current research assumes that this is an appropriate was of conceptualising behaviours such as dietary changes due to the fact that they are complex (in that many factors influence an individual's dietary choices) and that they are regularly repeated (most individuals eat several times a day every day).

As well as describing sustainable consumer behaviour changes over time, the SSBC model provides theoretical insight with which to tailor interventions aimed at encouraging sustainable consumer behaviour changes. The crux of the stages of change approach to interventions is that interventions will be more effective at encouraging behaviour changes when they are tailored to the stage of change an individual is currently at. Bamberg (2013b) tested this by tailoring interventions aimed at encouraging public transport usage to the stage of change individuals reported themselves to be at currently with regards to public transport usage. They found that the tailored information led to greater public transport usage thus providing support for interventions tailored to the different stages of change. Klockner's (2017) paper showed that the SSBC model explained individuals reducing their beef consumption, thus implying that interventions tailored to the stage of change an individual is currently at would also be more effective at reducing beef consumption than generalised approaches. We suggest that this will extend to meat consumption as a whole and look at the effect of an injunctive norm intervention to investigate how injunctive norm interventions can be tailored to the current stage of change an individual is at to increase the changes that they will change their behaviour.

The different stages of the SSBC model and how goal, behavioural and implementation intentions guide the movements between the different stages and lead to behaviour changes.

In Bamberg's (2013) SSBC model there are 4 distinct stages of change, pre-contemplation, contemplation, action and maintenance. Each stage represents a distinct collection of actions, values, attitudes and perceptions about the target behaviour. The first of the stages is the pre-contemplation stage. In this stage of change individuals (using our context) are not considering reducing meat consumption. This could be for many different reasons, for example they may not see any need to do so as they do not consider it harmful to themselves or the environment, or alternatively they may not be concerned about the negative aspects of their consumption at all. Individuals in this stage of change may also be concerned about the negative outcomes related to their behaviour but feel helpless or unable to change it, as they do not know any alternatives or can't imagine living without the amount of meat they currently eat. Therefore, in order to progress from this stage to the next

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stage of change (contemplation) individuals need to form a strong enough goal intention to reduce their current meat consumption. A goal intention is defined as an overall abstract goal to change one's current behaviour. So, in this case the relevant goal that an individual will form is to reduce the amount of meat that they will eat. However, the goal intention does not include any specifics of how they will do this or lead necessarily to any alternative behaviour that will replace the current behaviour an individual has a goal to reduce or eliminate. For example, an individual may have an overall goal that they would like to lose weight, but a goal alone will not lead them to enact any specific behaviours that could lead to them losing weight.

The next stage of change is known as the contemplation stage. This is the stage whereby an individual recognises the need to change their behaviour, so for example they could recognise that the amount of meat they currently eat is harming the environment and that by reducing it they could reduce the harm. However, at the contemplation stage there is no specific plans for how an individual is going to change their current behaviour. At this stage there is no further planning beyond the recognition of a need to change existing behaviour. Unlike the previous stage there is likely to be action that is aimed towards changing behaviour at some point in the future (note at this stage plans to change at some point are vague and not concrete). Therefore, in order to progress from this stage to the next stage of change (action) individuals need to form a strong enough behavioural intention. A behavioural intention is defined as an intention to enact a specific behaviour, so for example in our current context this could be to not eat meat at home, a behaviour which would tie in with the overall goal of reducing their meat consumption. A behavioural intention means that an individual now has a course of action that allows them to fulfil their overall goal intention. However, behavioural intentions are still lacking in some specifics that mean they are not necessarily translated directly to behaviour. The gap between behavioural intentions and actual behaviour is well documented in sustainable consumption research (e.g. McEachern et al, 2005; Hassan et al, 2016). Behavioural intentions lack specific plans of how to enact the new behaviour, so for example though you may intend to not eat meat at home, you need to alter your weekly shopping plans to account for this change, you may need to learn or research new recipes or consider the your nutritional requirements. Without these specific bits of knowledge to plan and cope with the different aspects of translating the behavioural intention into actual behaviour, it is likely the case that the intentions will not be successfully translated into repeated behaviour over time.

Following contemplation is the action stage of change. At the action stage of change an individual may be trialling alternative forms of behaviour that they have formed behavioural intentions for in line with their overall goals. For example, this could be to try new vegetarian recipes or buying different products at the supermarket in line with trying to reduce their meat consumption. In order to progress forward from the action to the maintenance stage, individuals must form strong specific implementation intentions for enacting the behaviour they intend to follow. Implementation intentions are specific detail intentions that back up a behavioural intention, for example if the behavioural intention is to eat more vegetarian evening meals then the implementation intentions that facilitate that would be planning a specific evening to eat a specific vegetarian recipe on and planning a time and place to shop for the specific ingredients required. The specific commitments made in implementation intentions should lead to a greater likelihood that the behaviour will be carried out than if there is just a

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behavioural intention alone, therefore strong implementation intentions lead to maintaining a new behaviour.

The final stage of behaviour change is the maintenance stage. At this stage individuals are comfortable in implementing their chosen new behaviour and have the knowledge and ability to do so. At this stage they have also built up some resistance to behavioural relapses and so therefore they would be less likely to revert back to their original harmful behaviour than someone in the action stage. Getting individuals to the maintenance stage is the main aim of interventions that are looking to encourage lasting behaviour change as people who reach this stage are much more likely to continue the target behaviour than those who are just willing to try something new or act differently in a specific context.

Progress towards behaviour change means forward movement within the stages in the direction of pre-contemplation to contemplation to action to maintenance, with the target behaviour expected to change in the action and maintenance stages. However, this does not mean that movement within the stages of change is unidirectional, individuals can of course move back between the stages also. For example, individuals in the action stage may trial a new behaviour (for example, during Veganuary they may try and cut out meat and dairy altogether) but then following the end of the month they may decide veganism isn't for them and therefore reject that strategy for meat consumption, going back to the contemplation stage where they would still like to reduce meat consumption but have not decided a strategy for doing so.

The importance of understanding the distinct stages of change and the intention types that guide movement between them is that they provide a guide for how individuals should be moved towards lasting behaviour changes. Existing studies have shown (Klockner, 2014; Klockner, 2017) that interventions that are tailored to the stage of change an individual is at are more effective at encouraging behaviour change than generalised approaches that don't take into account the stages of change. It follows that for effective lasting behaviour changes we need to a) target the needs/concerns that an individual is likely to have at their current stage of change and b) focus on the specific intention type (e.g. goal intention for those in the pre-contemplation stage) that will move an individual forward to the next stage of change. Existing research has only focussed on tailoring information-based approaches to take into account the stages of change (e.g. Klockner, 2014; Klockner 2017). However, in the broader field of sustainable consumption research it has been shown that providing information alone is a flawed method of encouraging behaviour change as there are many other considerations (which can be more important) in determining behaviour. Therefore, we look to take the first step away from just tailoring informational approaches using the states of change model to look at how we can tailor an important social determinate of behaviour changes (injunctive norms) to individuals at the different stages of change.

How our understanding of the stages of change model implies that injunctive norms will be effective levers for long term behaviour change

If we assume that for more effective behaviour change campaigns, we need to tailor our interventions to the stage of change an individual is at in relation to the target

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behaviour, then that leaves us with the question of what interventions should be used for individuals in each of the stages. The SSBC model currently suggests that subjective social norms are a key consideration for moving individuals from the pre-contemplation to contemplation stages of change. This implies that

H1: The injunctive norm intervention will lead to a greater reduction in meat consumption at T2 & T3 than the information only condition.

Given what we know about how injunctive norms do not affect individuals uniformly when presented with differential cognitive and contextual factors (Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013), we suggest that injunctive norms will be more effective at encouraging individuals to reduce their meat consumption when they are at certain stages of change. Firstly given their ability to get individuals to re-evaluate their current behaviour and increase their interest in changing behaviours (Sparkman and Walton, 2017) we propose that injunctive norms will be effective at encouraging those in the pre-contemplation stage of change to form goal intentions and as such start on the process of self-regulated behaviour change leading to them reducing their meat consumption.

At the contemplation stage of change, individuals are required to choose specific behaviours that are in line with their overall goals to progress to the next stage of change. In terms of social influence, informational social influence would be most important here (such as can be provided through descriptive norms) as it can signal to individuals which behavioural strategies are the most effective (Deutch & Gerrard, 1955). We do not predict that injunctive norms have a specific role to play at this stage of change beyond reinforcing the goal intention that moves individuals to the contemplation stage. Therefore, we predict that the injunctive norm intervention will be less effective at encouraging meat consumption when targeted at individuals in the contemplation stage of change compared to the pre-contemplation stage of change.

At the action stage of change, individuals are required to form specific implementation intentions to translate their behavioural intentions into real behaviour. Injunctive norms have been shown to encourage continued sustainable consumer behaviour when individuals have already formed behavioural intentions and are carrying out that behaviour (Schultz et al, 2007). They are re-constructive in the sense that they provide social affirmation that individuals are doing the right thing, therefore encouraging them to implement what they have already decided to do. Therefore, we predict that injunctive norms will be more effective at encouraging individuals to reduce their meat consumption when targeted at individuals in the action stage of change than in the contemplation stage of change.

These predictions about the interactions between the current stage an individual is at and the effectiveness of an injunctive norm intervention to reduce meat consumption are summarised in *H2.*

H2: This reduction in meat consumption over time caused by the injunctive norm intervention will be greater for those participants who are in the a) precontemplation or b) action stages of change at T1.

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H1 and H2 look to test the main contribution of this paper, which is that injunctive norms are effective levers for longer term behaviour changes due to their ability to encourage individuals to both start reducing their meat consumption, and then maintain it once they have done so. But also, that their ability to do this will be impacted by the current stage of change of the individual they are targeted at. Hypotheses H3 and H4 look to test the mechanism by which they are able to do this, which is by being more effective at boosting the intentions that guide movement between the stages of change model and therefore leading to more advances through the stages of change of change to the action and maintenance stages where behaviour change would be expected. H2 and H3 look to test the mechanism by which injunctive norm impacts meat consumption by advancing individuals through the stages of change and this is the second main contribution of the current paper.

H3: The injunctive norm intervention will lead to a greater increase in goal, behavioural and implementation intentions than the information only condition.

H4: The injunctive norm intervention will lead to more movements forward (toward action and maintenance stages) in the stages of change model than the information only condition.

Methods

Participants

1000 participants were initially recruited through the participant finding website prolific.ac. They were asked to complete a short standardized questionnaire assessing their current stage membership in relation to reducing their meat consumption as well as key demographics to assess their suitability for the study. Those that were already maintaining sustainable dietary behaviours or were captives to their current diet (e.g. those unable to change due to health concerns) were told their further participation was not required. The remaining participants were split into the three groups of interest in the experimental design (pre-contemplation, contemplation, action) and 480 participants were randomly sampled from meaning 160 in each of the stages of change and invited to take part in the full study. 431 Participants completed the first wave of the study at t1 with 390 participants completing wave 2 and 349 participants completing wave 3, meaning a dropout rate of 19% from t1-t3.

Design

The participants will be invited to take part in a three-week field experiment about their diet. A 2x3 between subjects experimental design was used. The dependent variables are the movement between the stages of change and meat consumption, and the independent variables are the current stage of change (pre-contemplation, contemplation, action) and the social norm intervention (injunctive norm, information only). Data will be collected at T1 (start of study), T2 (one week from start of study, and T3 (three weeks from start of study). The three-week time period was chosen as in previous studies using the SSBC model have shown that most stage changes happen within the three week time period (Klockner, 2014).

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Procedure

The study took place over three waves, with participants undertaking wave one of the study once invited to take part which established a baseline stage of change and meat consumption as well as randomly assigning them an intervention (see appendix 1). Wave two was then sent to participants to complete one week after they had completed wave one, again measuring stage of change and meat consumption over the previous week. Finally wave three was sent to participants to complete two weeks after wave two, again measuring stage of change and the previous weeks meat consumption.

Measurement

Protein measure

Participants were asked to recall certain foods that they had eaten in the past week, this was intended to measure all meat consumption as well as alternative proteins such as fish, eggs or beans that each individual has eaten in the past week. The measure was designed to measure as accurately as possible total meat consumption over a 1-week time period without an overly invasive or complex measurement process that would discourage participation or increase dropout due to the need for a large number of participants in each of our experimental groups. For this reason, we excluded methods such as weighing or photo analysing each meal that our participants ate instead opting for a recall-based measure that was similar to that used by (Klockner, 2017) but wider in scope to incorporate total meat consumption as opposed to just beef.

The recall measure was split into different food types to prompt participants' memories of what they had eaten (Beef, Lamb, Pork, Chicken, Fish, Seafood, Eggs, Cheese, Beans & lentils, Meat replacements) as we felt that this would yield a better recall and less confusion over an open ended recall measure. To cover anything that participants felt was appropriate to include but was not included in our prompted categories there was also an open-ended section to report any protein rich foods not covered by the categories given. Participants were asked to record how many times they had eaten each food type in the past week and then what the average portion size in grams was when eating that food. In order to aid in this task, guidelines were given showing how many grams different common portion sizes were. Appendix 1 shows the guidelines given to all participants on estimating portion sizes. The final dependent variables were calculated using the data given in the recall measure, multiplying the number each individual food type was eaten by the average portion size and then adding together and grouping meats, non-meats and fish to get the total consumption (weight in grams) of each of these food types. The same measure was administered at T1, T2 and T3. The measure was reviewed and who participants had not filled in any information in the protein measure were excluded on the assumption it was more likely that they had declined to fill in the recall section of the questionnaire than they hadn't eaten any protein-based foods in the past week. Also, unusually high outliers were removed based upon review, firstly they were identified by reviewing participants that had eaten more than 3 standard deviations above the mean of total meat or non-meat consumption. Once these outliers were identified, the individual responses were reviewed to see if there were any unrealistic responses within the recall measure. We

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chose to exclude participants where the responses were clearly unfeasible such as claiming to eat a portion size of 1.5kg of beef several times a week, or eating 12 eggs on 40 separate occasions in a week. This to a final sample of 252 participants for analysis who had submitted suitable information for analysis over all three measurement points.

Stage measure and movement

The stage of change measure was a single item adapted for the studies context from Bamberg (2013) and this was repeated at each of the time points. The question posed was: Which statement best describes the level of meat that you currently eat? 1. At the moment I eat meat most meals and am happy with this level of consumption, I see no reason why I should reduce it. 2. At the moment I eat meat most meals. I would like to reduce the amount of meat that I eat but I feel that I would be unable to do so. 3. At the moment I eat meat in most of my meals. I am currently thinking about reducing the amount of meat that I eat, but I am unsure about how I would replace it in my diet. 4. At the moment I eat meat in most of my meals, but I aim to reduce the level of meat that I eat. I know how I would like to replace the meat content in my diet but as yet I haven't done this regularly, though I have tried several alternatives. 5. I have already reduced the amount of meat in my diet and I aim to continue doing so. 6. Because of health or other concerns I am unable to change my current diet.

Statements 1&2 signify that individuals are currently in the pre-contemplation stage. Statement 3 signifies that individuals are currently in the contemplation stage. Statement 4 signifies that individuals are currently in the action stage. Statement 5 signifies that individuals are currently in the maintenance stage. Statement 6 signifies 'captives' that are unable to change this behaviour.

Goal, behavioural and implementation intentions

Participants were also asked about their goal, behavioural and implementation intentions to reduce their meat consumption at each of the three time points using items adapted from Klockner (2017). Goal intention was measured using 2 items with 7-point scales (Please indicate the extent to which you agree with the following statements: 1, I intend to eat less meat in the near future; 2, I will make an effort to eat less meat in the future). Cronbach's alpha scores for the Goal intention measure were .967 at T1, .956 at T2 and .972 at T3. This shows strong internal consistency of the goal internal measure at each data collection point.

Behavioural intentions were measured with 6 items in total looking to encapsulate the different behavioural strategies for reducing meat consumption as outlined in Klockner (2017), 2 items measuring behavioural intentions to reduce meat portion sizes (Please indicate the extent to which you agree with the following statements: 1. I intend to reduce the size of my portions when I eat meat; 2. I will eat smaller portions of meat in the near future), 2 items measuring behavioural intentions to switch meat items for other ingredients (1. I will switch the meat in some meals for a different protein source (e.g. fish) in the near future; 2. I will make an effort to eat different forms of protein instead of meat) and 2 items measuring behavioural intentions to eat more vegetarian meals (1. I will eat more vegetarian meals; 2. I will make an effort to eat more vegetarian meals in the near future). Cronbach's alpha scores for the behavioural

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intention measure were .914 at T1, .933 at T2 and .939 at T3. This shows strong internal constancy within the behavioural intention measure at each data collection point.

Implementation intentions were measured using 3 items; one item to measure participants' intentions to implement the behavioural intention strategies outline in the behavioural intention measures. One item measuring intent to implement a plan to eat smaller portions of meat, one item measuring intent to implement a plan to eat different forms of protein to meat and one item measuring intent to implement a plan to eat more vegetarian meals (reducing – I have a specific meal in mind where I will reduce the amount of meat in the dish; replacing - I have a specific meal in mind where I will replace the meat in the dish.; vegetarian - I have a specific vegetarian meal in mind that I will eat in the near future). Cronbach's alpha scores for the implementation intention measure were .847 at T1, .884 at T2 and .899 at T3. This shows good internal consistency within the implementation measure at each data collection point.

Intervention

The interventions shown to participants (see: appendix 1) were made up from readily available information about meat consumption as well as results from a survey that formed part of our dataset in Paper 1 of this thesis. The aim of the information only condition was to make clear the environmental benefits of reducing meat consumption whilst providing the 'flexitarian diet' as a way of achieving this. The 'flexitarian diet' is understood as a diet whereby individuals still eat meat (unlike restrictive diets such as vegetarian or vegan), but they do so more sparingly so as to reduce the negative impacts of the overconsumption of meat (whether that be to the environment or their individual health). We chose this as the basis for the intervention due to it being deemed more appealing to a wider range of people than an appeal that would ask individuals to cut out meat completely (such as by encouraging veganism). The injunctive norm condition also provided some basic information about the benefits of reducing meat consumption but however unlike the information only condition it focuses on the social approval and acceptability of meat reducing diets in the UK. The aim of this intervention was to manipulate individuals' injunctive norms so that they perceive that others would see reducing their meat consumption as a good thing. Due to the wide area from which participants were recruited (Adult UK residents) the injunctive norm was very generalised to the whole UK population whereas ideally it would be more specific to a smaller group that individuals identify more strongly with. For example it a town council was to run a similar campaign they would likely be better of using the townspeople as the reference group rather than the UK as a whole as the targeted individuals are more likely to identify more closely with and therefore more likely to be influenced by other people in their own town rather than people in the UK more generally. However, in spite of this general focus of the manipulation, our manipulation check showed that the injunctive norm intervention did significantly increase the injunctive norm approving of reduced meat consumption.

Data Analysis

The data was collated and analysed in SPSS v24. The analysis is split into three main parts owing to the three main dependent variables, the meat measure, the three intention types and movements between the stages of change. Differences in meat

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consumption over time between experimental groups will be analysed using a three way mixed ANOVA, this allows us to look at the interaction between our two between subjects factors (intervention & stage of change at start) as well as our within subject factor (time) to see whether there is differences in behaviour changes and intentions between the experimental groups over time. Differences in goal, behavioural and implementation intentions over time will also be analysed using the same mixed ANOVA analysis. The movement in stages in change will be analysed using a generalised estimating equation (GEE) as this looks at the effects of between subjects factors (intervention type and stage of change at start) on an ordered categorical variable (movement between the stages of change).

Results.

Changes in meat consumption over time

Measure of meat consumption

Our exploratory analyses showed that our overall meat measure showed a wide range, very high standard deviations and large 95% confidence intervals (See appendix 2. Making interpretation of the results very difficult. A review of the QQ plots indicated the assumptions of normal distribution were extremely violated, this was confirmed by the results of Shapiro Wilk tests. Therefore, we examined whether we could use an alternative measure for meat reduction.

Our solution to the extreme deviations within the different conditions of the original meat measure was to take a relative rather than absolute measure self-reported meat consumption; that is, the proportion of meat items as a percentage of total protein rich foods eaten.

We calculated our meat proportion measure by taking the percentage of reported meat consumption (in grams) in the total reported protein rich foods. Given the large variation of total protein intake between participants and also to try and take better account natural variations in weekly protein based food intake given that we only have 3 measurement points, this measure is aimed at capturing whether participants were reducing their meat consumption in relation to their overall consumption in the given week of measurement. Table three shows the descriptive statistics of the percentage of total protein consumption that was meat between the experimental groups over time.

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Table 1. Descriptive statistics between the experimental groups for the dependent variable over time: Meat items as a percentage of the total of protein rich foods eaten.

Experimental groups	*Within-subject factor:* Time	T1	T2	T3
Between-subject factor: Normative Messages	*Between-subject factor:* Stages of Change	M *(SD)*	M *(SD)*	M *(SD)*
Injunctive norm	Pre-contemplation	60.11% *(20.22)*	65.03% *(18.22)*	54.85% *(24.55)*
	Contemplation	55.32% *(17.83)*	54.01% *(20.12)*	53.00% *(22.23)*
	Action	*54.13%* *(28.14)*	56.32% *(20.76)*	44.82% *(22.11)*
Information only	Pre-contemplation	*49.19%* *(18.99)*	55.65% *(23.43)*	60.33% *(20.13)*
	Contemplation	*56.20%* *(20.00)*	61.52% *(23.02)*	56.38% *(24.05)*
	Action	*51.60%* *(19.67)*	54.15% *(20.43)*	51.38% *(20.77)*

Notes. T1 = measure immediately after receiving the experimental message; T2 = one week after receiving the experimental message; T3 = three weeks after receiving the experimental message.

The descriptive statistics in table 1 clearly show that across groups in all three stages of change there was a greater reduction in the percentage of meat as a proportion of total protein intake being eaten in the injunctive norm condition, and as a result a lower percentage of meat overall being eaten in the injunctive norm condition at T3. To test whether this trend was statistically significant we ran a three way mixed ANOVA to look at the effects of the intervention and the starting stage of change over time.

Mixed ANOVA (percentage of meat consumption as a proportion of total protein consumption) results:

In order to determine whether the reductions in meat consumption as a percentage of total protein intake above were significantly impacted by the intervention and whether there was any interaction between the intervention and the stage of change at T1 we conducted a 3-way mixed ANOVA. The meat consumption data was normally distributed across all of the experimental groups at each time point as assessed by the Shapiro-Wilk test of normality, with the exception of action*injunctive norm group at T1. Sphericity was assumed using Mauchly's test of sphericity. There was homogeneity of variances of the percentage of meat consumption at T2 (p=0.280) & T3 (p=0.608), but not at T1 (p=0.032) as assessed by Levene's test for equality of variances. Results are shown in table 2.

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Table 2. ANOVA: Summary of results.

DV: Percentage of meat consumption	*F* (df)	*p*	partial η2
Between-subject IV: Stages of Change (SoC)	2.159 (2, 240)	0.118	0.018
Between-subject IV: Message Framing (MF)	0.013 (1, 240)	0.909	<0.001
Within-subject IV: Time (T)	4.428 (2, 240)	0.012	0.018
Two-way interactions:			
SoC * MF	1.689 (2, 240)	0.187	0.014
SoC * T	1.284 (4, 482)	0.275	0.011
MF* T	5.212 (2, 240)	0.006	0.021
Three-way interaction:			
SoC * MF * T	2.047 (4, 482)	0.087	0.017

Notes. DV = Dependent variable; IV = Independent variable.

The results show that there are borderline significant two way and three-way interactions between the intervention and stage of change at the start of the study on the proportion of meat being eaten over time. The injunctive norm led to a greater reduction in the proportion of meat being eaten over time than the information only condition, thus showing support for H1. Furthermore, the three-way interaction showed that the effectiveness of the intervention varies over time when targeted at people who start in the different stages of change. The reduction in the proportion of meat being eaten for those in the precontemplation stage (mean at t1 = 60.11%, mean at t3 = 54.85%) and action stage (mean at t1 = 54.13%, mean at t3 = 44.82%), was greater than the reduction of those in the contemplation stage (mean at t1 = 55.32%, mean at t3 = 53%). This three-way interaction suggests that the injunctive norm is a more effective intervention for reducing individual's meat consumption when targeted at those individuals in the pre-contemplation and action stages of change rather than those in the contemplation stage of change.

Changes in goal, behavioural & implementation intentions over time.

Changes in goal intentions to reduce meat consumption:

An increase in goal intentions leads to an increased likelihood of an individual moving from the pre-contemplation to contemplation stage of change and therefore is an important part of the process of behaviour change. This section will look to determine the effects of the different interventions over time on the Goal intention and how this interacts with the stage of change an individual begins at.

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We conducted a 3 way mixed ANOVA to assess whether the differences in goal intentions over time were significantly impacted by the intervention type and stage of change at the start of the study.

Table 3. ANOVA: Summary of results.

DV: Goal intentions			
	F (df)	*p*	partial η2
Between-subject IV: Stages of Change (SoC)	154.208 (2, 245)	>0.001	0.556
Between-subject IV: Message Framing (MF)	1.720 (1, 245)	0.191	0.007
Within-subject IV: Time (T)	4.232 (2, 245)	0.015	0.017
Two-way interactions:			
SoC * MF	0.199 (2, 245)	0.819	0.001
SoC * T	7.567 (4, 492)	>0.001	0.058
MF* T	0.012 (2, 245)	0.988	>0.001
Three-way interaction:			
SoC * MF * T	0.267 (4, 492)	0.899	0.002

Notes. DV = Dependent variable; IV = Independent variable.

Our results show that goal intentions did increase over time but significantly more so for those in the pre-contemplation stage of change than those in the other stages. This is as expected as goal intentions are likely to be already strong for those in the contemplation and action stages. This provides evidence that the stages of change model work as we would expect in that the stage of change determines the level of different intention types that guide behaviour. However, we did not find support for H2 that the injunctive norm condition would lead to greater increases in goal intention than the information only condition. There were no significant two- or three-way interactions between the intervention type and stage of change or time.

Changes in behavioural intentions to reduce meat consumption

An increase in behavioural intentions leads to an increased likelihood of an individual moving from the contemplation to action stage of change and therefore is an important part of the process of behaviour change. This section will look to determine the effects of the different interventions over time on behavioural intentions and how this interacts with the stage of change an individual begins at.

We conducted a 3-way mixed ANOVA to assess whether the differences in behavioural intentions over time were significantly impacted by the intervention type and stage of change at the start of the study. The results are presented in Table 4 below.

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Table 4. ANOVA: Summary of results.

DV: Behavioural intentions	*F* (df)	*p*	partial η2
Between-subject IV: Stages of Change (SoC)	100.824 (2, 245)	<0.001	0.450
Between-subject IV: Message Framing (MF)	3.768 (1, 245)	0.053	0.015
Within-subject IV: Time (T)	0.641 (2, 245)	0.527	0.003
Two-way interactions:			
SoC * MF	0.523 (2, 245)	0.594	0.004
SoC * T	1.253 (4, 492)	0.288	0.010
MF* T	0.471 (2, 245)	0.625	0.002
Three-way interaction:			
SoC * MF * T	1.454 (4, 492)	0.215	0.012

Notes. DV = Dependent variable; IV = Independent variable.

The results show that behavioural intentions did not significantly change over time and the injunctive norm didn't lead to a greater increase in behavioural intentions for individuals in any of the stages of change. The results showed that as expected the current stage of an individual significantly determines the behavioural intention to reduce meat consumption. We therefore did not find that support for **H3** in that the injunctive norm intervention did not significantly increase behavioural intentions to reduce meat consumption over time.

Changes in implementation intentions to reduce meat consumption

An increase in implementation intentions leads to an increased likelihood of an individual moving from the action to maintenance stage of change and therefore is an important part of the process of behaviour change. This section will look to determine the effects of the different interventions over time on implementation intentions and how this interacts with the stage of change an individual begins at.

We conducted a 3-way mixed ANOVA to assess whether the differences in implementation intentions over time were significantly impacted by the intervention type and stage of change at the start of the study.

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Table 5. ANOVA: Summary of results.

DV: Implementation intentions	*F* (df)	*p*	partial η2
Between-subject IV: Stages of Change (SoC)	71.721 (2, 245)	<0.001	0.368
Between-subject IV: Message Framing (MF)	3.438 (1, 245)	0.065	0.014
Within-subject IV: Time (T)	3.789 (2, 245)	0.023	0.015
Two-way interactions:			
SoC * MF	0.275 (2, 245)	0.594	0.002
SoC * T	3.758 (4, 492)	0.005	0.030
MF* T	0.088 (2, 245)	0.916	>0.001
Three-way interaction:			
SoC * MF * T	0.783 (4, 492)	0.537	0.006

Notes. DV = Dependent variable; IV = Independent variable.

The results show that as expected which stage of change an individual is at significantly predicted the implementation intentions overall. Also, there was a two-way interaction between stage of change of the individual at T1 and time, this shows that the stage of change also determined the likelihood of the implementation intention to eat less meat increase over time. This is expected as implementation intentions are only the next immediate transition point for individuals in the action stage of change and therefore those in the pre-contemplation and contemplation stages are further away from that transition point. Therefore, any intervention is less likely to cause them to form implementation intentions when they must form goal and/or behavioural intentions to progress through the process of behaviour change first. However, we did not find any significant effect for our intervention type suggesting that injunctive norms were not more effective at getting individuals to form implementations overall. Also, the non-significant interaction between the intervention type, time and stage of change suggests that there also was not a significant difference in how individuals in different stages of change responded to the different intentions in terms of how It led them to form implementation intentions.

In summary we did not find any significant support for our predictions in *H3.*

Movements through the stages of change over time

Movements forward through the stages of change would be expected to accompany actual behavior change. The ultimate goal for behavior change interventions being measured by the stages of change model is to progress participants to the maintenance stage whereby the new behavior has built up resistance to relapses back to the existing (unsustainable behavior). Therefore in this section of the analysis we look at the extent to which the intervention encouraged movement forward through the stages of change as this should signify that either behavior changes are likely to follow

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(in the case of movement to the action stage) or that they are likely to continue (in the case of movement to the maintenance stage).

Table 6 shows how individuals progressed or regressed through the stages depending on the experimental group they were assigned.

Table 6. Frequencies of the movement between stages of change of individuals in each experimental group.

DV: Stage of change *IV's: Stage of change at beginning, intervention type, time*	*Stages moved*	*Movement at T2 (No)*	*Movement at T3 (No)*
Start at pre-contemplation, Info only intervention	0	38	38
	1	4	6
	2	4	1
	3	1	2
Start at pre-contemplation, Injunctive norm intervention	0	35	37
	1	4	3
	2	3	1
	3	2	3
Start at contemplation, Info only intervention	-1	12	6
	0	17	21
	1	12	8
	2	2	8
Start at contemplation, Injunctive norm intervention	-1	3	7
	0	20	10
	1	12	8
	2	7	17
Start at action, Information only intervention	-2	1	3
	-1	8	4
	0	21	17
	1	9	15
Start at action, Injunctive norm intervention	-2	2	1
	-1	4	7
	0	19	14
	1	12	15

Notes. DV = Dependent variable; IV = Independent variable. Number in 'Stages moved' represents how many stages from the initial stage at T1 whereby positive numbers are progress from pre-contemplation to maintenance and negative numbers refer to movements the other way. For example, for the pre-contemplation conditions a movement value at 2 means the individual has moved from the pre-contemplation to action stages and for the action conditions -1 would mean an individual has moved from the action to contemplation stage of change.

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As we can see from the table, only a small proportion of the participants in the pre-contemplation stage moved forward to the latter stages of change, also there is no clear contrast between the information only and injunctive norm interventions.

The table shows that more participants moved at least one stage when starting in the contemplation group versus the pre-contemplation group suggesting that this stage of change is less stable than the pre-contemplation stage. Between T1 and T2 it many less participants in the injunctive norm condition regressed back to the precontemplation stage than those given information only (IN:12 v Info:3), furthermore more participants in the injunctive norm condition moved forward at least one stage than in the information only condition (IN:19 v Info:14). By T3 the difference between the intervention groups in regressing back to the precontemplation stage was negligible (6 in info only & 7 in the injunctive norm group). But the number of participants progressing at least one stage forward was still greater in the injunctive norm condition than the information only condition (IN:25, Info:16). At both T2 and T3 more participants progressed than regressed, which would be expected in line with the reduction in meat consumption shown in the previous results section.

As with the participants who started in the contemplation stage, those who started in the action stage were more likely to progress than regress through the stages as shown by the figures above and further supporting the overall reductions in meat consumption seen elsewhere in this results section. At T2 slightly more individuals in the injunctive norm condition progressed to the maintenance stage than in the information only condition (IN:12, Info:9) and slightly less individuals in the injunctive norm regressed back at least one stage than in the information only condition (IN:6, Info: 9). By T3, the progress forward to the maintenance stage was the same for both intervention conditions and only one more person in the injunctive norm condition regressed back than in the information only condition.

Overall the descriptive statistics show the injunctive norm to lead to greater progress through the stages for those who started in the contemplation stage, and negligible differences between the two intervention conditions for those starting in the pre-contemplation and action stages. In order to determine whether the difference in how the interventions moved individuals through the stages of change was significant we used a Generalized estimating equation (GEE), which can assess the impact of a factor (Intervention type) on changes of an ordinal variable (stage of change) over time (between T1, T2 & T3). Testing the effect of the intervention on movement between the stages of change over time in the GEE model showed that the effect was insignificant ($Chi^2 = 0.412$, $p = 0.516$). This means that though overall the injunctive norm condition led to more stage progressions than the information only condition, neither of the two interventions presented to participants led to significantly more or less stage movements. Therefore, we cannot conclude that the injunctive norm condition led to more stage movements forward and therefore we must reject H3 on the basis that no statistically significant evidence was found.

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Discussion

General Discussion

The current study has provided evidence that injunctive norms interventions are more effective at encouraging individuals to reduce the proportion of meat they eat than informational interventions. Furthermore, we have shown a borderline significant interaction between the intervention type and stage of change an individual is currently at in determining how effective the intervention will be at reducing the proportion of meat eaten over time. The injunctive norm caused greater reductions in the proportion of meat eaten when targeted at participants in the pre-contemplation and action stages of change than when targeted at participants in the contemplation stage of change. However, although there were supportive trends, our analysis did not show that an injunctive norm manipulation had a significantly greater effect on the intention types that guide individuals through the stages of change, or a significant effect on moving individuals through the stages of change than the information only condition. Therefore, whilst we have significant and borderline significant evidence that supports our predictions in ***H1*** and ***H2***, we do not have conclusive statistical evidence supporting ***H3*** or ***H4***.

Theoretical implications

The current study affirms the power of injunctive norms in encouraging sustainable consumer behaviors adding to a body of evidence that suggests this is the case (Cialdini, 1990; Schultz, 2007; De Groot et al, 2013). Our longitudinal analysis showed that consistent with our theorizing that injunctive norms would change behavior through moving individuals through the stages of change, the reduction in the proportion of meat individuals ate was greatest at our third measurement point rather than rebounding as has been the case in some previous social norms interventions (e.g. Allcott, 2011). This provides supporting evidence for the longevity of the impact of injunctive norm interventions.

Our main novel theoretical contribution is however to show for the first time that how effective injunctive norms are at changing behavior is partly determined by the stage of change individuals are at. We have shown that not only do injunctive norms encourage those in the pre-contemplation stage to re-evaluate their behavior, leading to them reducing the proportion of meat that they eat, but also how they help those in the action stage of change to continue and further reduce the proportion of meat in their diet. We believe that this is an important contribution to our understanding of how injunctive norms encourage long term behavior changes. Research to date has emphasized that different norms have different impacts on behavior in different contexts (Gockeritz et al, 2010; White & Simpson, 2013, Melnyk et al, 2013). Our research suggests that when individuals are undergoing a process of changing a repetitive and difficult behavior to change, injunctive norms will impact differently depending on what stage of change the individual is going through.

We did not however find significant evidence however for the mechanism by which the individuals went about reducing the amount of meat that they eat. The injunctive norm

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intervention did not lead to significantly greater increases in goal, behavioral or implementation intentions than the

Practical implications

Our demonstration of the effectiveness of injunctive norms in encouraging individuals to reduce their meat consumption provides evidence for using injunctive social norms to encourage sustainable consumer behaviors that are repeated and difficult to shift. Furthermore, the interaction between the injunctive norm message and the stage of change an individual is at suggests that injunctive norm campaigns should be targeted at individuals in the pre-contemplation or action stages of change. Identifying the stage of change of individuals is not strenuous as it can be done with a single item measure and so therefore it is reasonable to expect that practitioners can relatively easily collect this data and use it to better target their behavior change campaigns.

Areas for further research

The current research finds promising results for targeting injunctive norms at specific stages of change in order to maximize their effectiveness in causing behavioral changes. Future research should look to replicate these findings in different sustainability contexts in order to show that our results were not specific to reducing meat consumption, particularly as the SSBC model and injunctive norms have independently shown to explain many different sustainable consumer behaviors, but the interaction between them is new in this research and so has only been tested in one context thus far.

More attention should be payed to the mechanism by which the interaction effect we found occurs, as we did not find evidence that supported our hypotheses that injunctive norms would lead to significantly greater movement in the stages of change and stronger goal, behavioral and implementation intentions. Longitudinal studies spread over a longer period of time may better encapsulate stage changes than our study which took place over just three weeks, which was potentially not enough time for individuals to recognize or put into action substantial changes to the way they think about their diet.

Conclusion

The current paper found strong evidence that injunctive norms are an effective lever for reducing meat consumption over time. Moreover, we found a three-way interaction approaching significance suggesting a previously undiscovered relationship between injunctive norms, the stage of change of the individual is targeted at and the proportion of meat in an individual's diet over time. The injunctive norm led to greater behavior change when targeted at individuals in the pre-contemplation and action stages of change, thus adding to a growing body of research that determines when different social norms appeals are most effective. Furthermore, we provided evidence that challenges one of the existing assumptions of the SSBC model that social norms only play a role at the beginning of the behavior change process. By showing that injunctive norms encourage further behavior change for those individuals in the action stage we showed how injunctive norms play an important motivating role at least in 2 of the

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stages of change in the SSBC model. Our key theoretical contributions are therefore twofold, firstly showing that social norms become more or less effective depending on the stage of change that they are targeted at. Secondly, we showed that the existing SSBC model doesn't fully account for the role of social norms in the process of behavior change and we provided evidence that supported our prediction that injunctive norms also have a re-invigorating effect on behavior for those who already intend to change their behavior.

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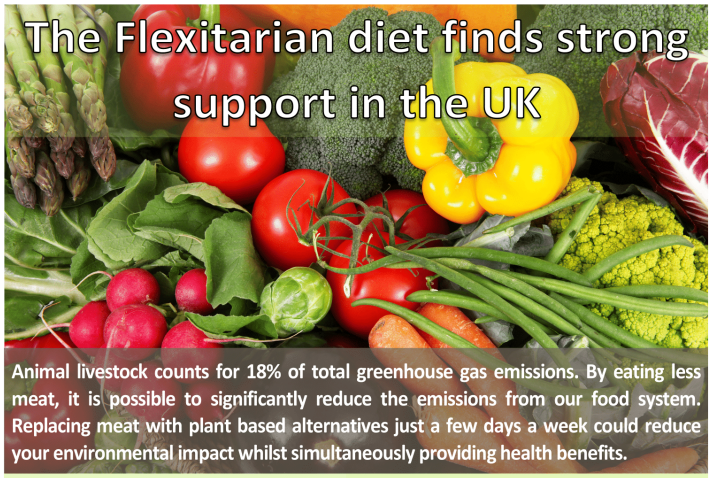
Appendices:

Appendix 1: Intervention treatments shown to participants:

Injunctive norm group:



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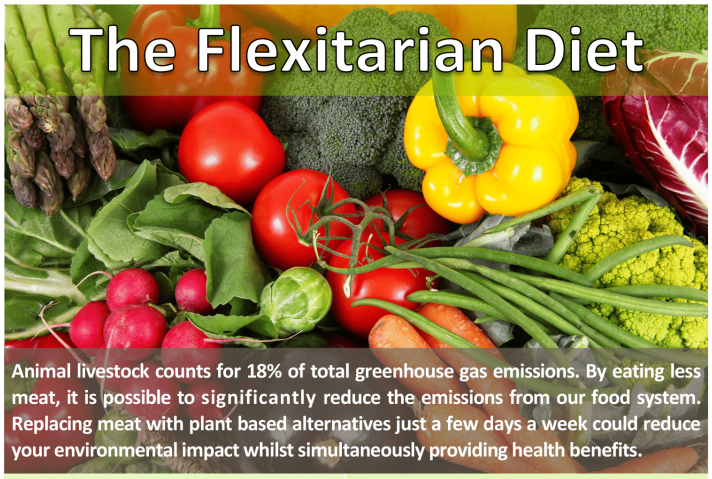
Information only group:



One way of eating less meat could be a 'flexitarian' diet. Flexitarianism (or flexible vegetarianism) means to reduce the amount of meat one eats without completely giving it up like a vegetarian. So why not gain the health and environmental benefits of eating less meat without depriving yourself of meat entirely? You could start by reducing the number of meals with meat over the next few weeks.

Did you know?

- Replacing meat with non-meat proteins in just half your meals could reduce your Greenhouse gas emissions by nearly 20%
- The co^2 required to produce one beef burger is the equivalent to driving 67 miles!
- Could you gain health benefits whilst helping the environment by becoming flexitarian?

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Appendix 2: Overall meat consumption in grams of participants in each group at each measurement point, including mean reductions between stages and tests of normality of each group.

Table 1: Figures show the overall meat consumption in grams

Experimental group/Time	T1 (mean/s.d.) *(95% C.I.)*	T2 (mean/s.d.) *(95% C.I.)*	T3 (mean/s.d.) *(95% C.I.)*
Injunctive norm/Precontemplation	(1637/1464) *(1192, 2082)*	(1352/1031) *(1038, 1665)*	(941/1228) *(791, 1563)*
Injunctive norm/Contemplation	(1672/1626) *(1165, 2179)*	(1394/1314) *(984, 1803)*	(1371/1405) *(933, 1809)*
Injunctive norm/Action	(1596/1451) *(1050, 1875)*	(1054/729) *(811, 1297)*	1030/908 *(728, 1333)*
Info only/Precontemplation	(1655/1534) *(1219, 2127)*	(1313/1027) *(1021, 1629)*	(1458/1020) *(1176, 1777)*
Info only/Contemplation	(1410/942) *(1120,1700)*	(1143/869) *(876, 1411)*	(1181/1183) *(817, 1545)*
Info only/Action	(1504/1289) *(1071, 1777)*	(1324/964) *(1011, 1636)*	(1073/716) *(841, 1306)*

Table 2: Figures show the reduction of meat in grams between groups at different time points.

Experimental group/Time	T1-T2 change in meat consumption (grams)	T1-T3 change in meat consumption (grams)
Injunctive norm/Precontemplation	*-285*	*-696*
Injunctive norm/Contemplation	*-278*	*-301*
Injunctive norm/Action	*-542*	*-566*
Info only/Precontemplation	*-342*	*-199*
Info only/Contemplation	*-267*	*-229*
Info only/Action	*-180*	*-431*

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Table 3: Figures show the results of a shapiro-wilk test of normality in each experimental group at each measurement point for our measure of overall meat consumption.

Experimental group/Time	T1 (S-W statistic, df, sig)	T2 (S-W statistic, df, sig)	T3 (S-W statistic, df, sig)
Injunctive norm/Precontemplation	*(0.824, 44, p<0.001)*	*(0.902, 44, p=0.001)*	*(0.705, 44, p<0.001)*
Injunctive norm/Contemplation	*(0.728, 42, p<0.001)*	*(0.820, 42, p<0.001)*	*(0.704, 42, p<0.001)*
Injunctive norm/Action	*(0.877, 37, p=0.001)*	*(0.846, 37, p<0.001)*	*(0.820, 37, p<0.001)*
Info only/Precontemplation	*(0.778, 47, p<0.001)*	*(0.912, 47, p=0.002)*	*(0.886, 47, p<0.001)*
Info only/Contemplation	*(0.941, 43, p=0.027)*	*(0.875, 43, p<0.001)*	*(0.712, 43, p<0.001)*
Info only/Action	*(0.865, 39, p<0.001)*	*(0.901, 39, p=0.002)*	*(0.918, 39, p=0.008)*

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Chapter 4: Research paper 3 - Amending the role of social norms in the stages of change model

Introduction

Developing our understanding of social norms in the stages of change model

The stage model of self-regulated behaviour change (Bamberg, 2013) provides a comprehensive theoretical model for understanding the process of adopting sustainable consumer behaviours. It has accurately depicted how individuals adopt more sustainable transport choices (Bamberg, 2013b) move into energy-efficient homes (Schaffner et al, 2017) and reduce beef consumption (Klockner, 2017). The model suggest that individuals can change repeated everyday behaviours such as food consumption that may be habitual (Verplanken and wood, 2006) and difficult to shift if they engage in a process of effortful self-regulation. The different stages represent how an individual can move from abstract thoughts about wanting to change their current behaviour to concrete and repeated alternative behaviours. The model also incorporates popular theories of environmental psychology (e.g. Azjen, 1991; Schwartz & Howard, 1981) to suggest the psychological factors that are important for moving forward through the stages of change. The model currently predicts that social norms only have a role to play in the formation of abstract goals to change current behaviour, but not at the latter stages of change where substantive and lasting changes are likely to take place. The current paper contends that this assumption of the SSBC model is incorrect as we would theoretically expect different social norms to play different roles throughout the stages of change.

Reducing meat consumption as a sustainable consumer behaviour

The current paper looks at the context of meat consumption, more specifically the strategies that individuals adopt to reduce their meat consumption and the factors that play a role in the process of that reduction. The production of meat is a large emitter of greenhouse gasses as well as being comparatively resource intensive (for example in terms of land and water) by comparison to many plant-based alternatives (Tukker et al, 2011). Individuals can often effectively reduce the environmental footprint of their diet by reducing the amount of meat that they eat (Westhoek et al, 2014). This is particularly the case in western societies such as the UK where meat consumption is comparatively high compared to the global average (Ritchie & Roser, 2017). In recent years the popularity of meat reducing diets such as veganism and 'flexitarianism' (Raphaely & Marinova, 2014) has been growing in the UK (Smithers, 2018) and as such we believe that the UK is presents an interesting context for studying the motivations behind how individuals are going through the stages of change towards reducing their meat consumption.

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Literature review

Distinguishing different social norms effects on meat consumption

Social norms have long been distinguished into two distinct categories which refer to different individual perceptions of others and can impact behaviour in different ways (Cialdini, 1991). Descriptive norms are defined as an individual's perceptions of what other people do in a specific behavioural context. Injunctive norms refer to an individual's perception of what is the socially acceptable behaviour in a given individual context. The distinction between descriptive and injunctive norms is important when it comes to behaviour change as they can impact on behaviour in different ways.
Injunctive norms play a key role in causing individuals to re-evaluate their current behaviour (Melnyk et al, 2011). By making individuals aware of what is socially expected of them, it can trigger their own feelings of a personal moral obligation to act in line with the norm (Schwartz, 1981). In this sense, salient injunctive social norms play a key role in getting individuals to re-evaluate their current behaviour, which according to the SSBC model is a key component of breaking out of repeated and/or habitual behaviour. This isn't the only way in which injunctive norms have been shown to influence behaviour changes, they have also proved effective at getting individuals to maintain recently adopted behaviour changes (Schultz et al, 2007). This is due to the perceived social rewards of enacting a recently adopted behaviour. For example, upon trying more vegetarian meals, an individual may find that they are missing meat and thus making continued behaviour change toward reducing their meat consumption difficult. However, when they perceive that those around them are supportive of their actions then this can have a galvanising effect on their efforts to continue the change due to the 'social reward' that they gain.

Descriptive norms encourage behaviour through suggesting what is an effective behaviour to carry out in a given context. Descriptive norms have proven to effectively encourage sustainable consumer behaviours across many different contexts, for example energy conservation (Allcott, 2011), water conservation (Bernedo et al, 2014), reusing hotel towels (Goldstein et al, 2008) and reducing littering in public spaces (Cialdini et al, 1990). Descriptive norms provide individuals with information about what is an effective behaviour in a given context through providing 'social proof' (Cialdini et al, 1990). For example, if an individual is deciding what restaurant to go to for dinner, they may think about where their friends have gone for dinner recently in order to help them make the decision. In this scenario, the individual is inferring that they will make a better choice of restaurant if they follow what others around them are doing. It is this information that we infer from what others are doing around us that can help us decide what an effective behaviour is, particularly in scenarios when we are uncertain or inexperienced. This means that descriptive norms can be particularly useful in helping us select specific behaviours that are aligned with our overall goals. However, a key issue with descriptive norms is that in cases of sustainable consumer behaviours such as reducing meat consumption, at present there is only a minority of individuals that are undertaking this behaviour (Smithers, 2018). It is therefore difficult to leverage people's perceptions of what others are doing in order to change their behaviour when not many people around them are undertaking the target behaviour either. Yet there are other social norms that can still be harnessed to encourage behaviour change even when there is only a minority of people currently undertaking the target behaviour. Firstly, injunctive norms have been shown to be effective at

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encouraging behaviour change even when the descriptive norm is unsupportive (Schultz et al, 2007). Also, the change of individuals behaviour over time can be harnessed as a distinct social norm that can effect behaviour changes (Sparkman & Walton, 2017).

Trending descriptive norms (sometimes referred to as dynamic norms) are an individual's perceptions of how others behaviour is changing over time (Sparkman & Walton, 2017; Mortensen et al, 2019). They have been shown as effective at encouraging meat reducing behaviours even when the descriptive norm suggests only a minority of people are currently carrying out the behaviour (Sparkman & Walton, 2017). This suggests an important role in particular for difficult sustainable consumer behaviours such as reducing meat consumption as currently western populations such as in the UK are high meat consumers and as such individuals' perceptions of what others around them are doing are unlikely to be supportive of lower meat consumption. It is theorised that trending descriptive norms effect behaviour in two key ways; firstly they impact an individual's perceptions of what the future descriptive norm is likely to be (e.g. low meat diets will be a majority behaviour in the future), and secondly by changing their perceptions of what others deem an important behaviour (the injunctive norm). Moreover, in spite of a paucity of studies into trending descriptive norms thus far, Sparkman and Walton's (2017) longitudinal analysis showed the lasting effects of an intervention to reduce water consumption over several weeks after the intervention.

These three types of norms are clearly linked. For example, an individual's perceptions about what others around them are doing (descriptive norm) may lead them to draw conclusions about what is the socially acceptable thing to do (injunctive norm). Furthermore, the growth in certain behaviours (trending descriptive norm) may lead individuals to re-evaluate what is acceptable in certain contexts (injunctive norm). However, the three types of norm are conceptually distinct and as they are not always aligned. Moreover, the distinction is important as it can lead to different impacts on behaviour. The differing impacts on behaviour we suggest can partially be explained by their role (or lack of) in moving individuals through the different stages of the behaviour change process. However, whilst this differential impact on behaviour has been explored in the research to some extent (e.g. Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013), the idea of norms playing roles at different stages of the behaviour change process has yet to be explored. This we believe is a potentially important oversight as understanding what part different social norms play at different stages of the process of behaviour change could shed light on the mechanisms of how social norms do (or don't) lead to behaviour changes.

How the stages of change model explain behaviours that reduce meat consumption.

The stage model of self-regulated behaviour change or SSBC (Bamberg, 2013) is a theoretical model that describes the different stages an individual goes through when purposefully changing their current behaviour to a new behaviour. The stage model assumes that in order to change repeated and habitual behaviours, individuals must go through a process of effortful self-regulation to successfully adopt and maintain a new desired behaviour. The SSBC shows that process of behaviour change goes through four distinct stages of change over time, which in order are: pre-contemplation, contemplation, action and maintenance. The names of these stages are taken from

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the transtheoretical model (Prochaska, 2013) as the SSBC heavily draws on that theoretical model, however Bamberg (2013, 2013b) showed that a four-stage model was more appropriate than the transtheoretical models five stages in describing sustainable consumer behaviour changes. Several papers have since tested the SSBC's validity across a multitude of sustainable consumer behaviours from choosing public transport (Bamberg, 2013b), choosing to purchase an electric vehicle (Klockner, 2014), postponing new smartphone purchases (Fainting et al, 2018) and reducing beef consumption (Klockner, 2017) thus making the SSBC a solid theoretical and empirical basis to understand the process of adopting sustainable consumer behaviours. We therefore think it highly likely that the process by which individuals reduce their meat consumption will follow the stage transitions that the model sets out, particularly given the empirical evidence in Klockner's (2017) study which looked at how individuals reduce their beef consumption in Norway.

The first stage of change is the pre-contemplation stage, here the individual is currently does not see any need to change their behaviour or does want to change their behaviour but thinks they would be unable to do so. At this stage therefore it is suggested to make individuals aware of the negative aspects of their current behaviour as well as the negative consequences of them continuing the behaviour so that they feel personally obliged to change. This personal obligation to change is termed as a personal norm (Schwartz & Howard, 1981) and the model assumes that these feelings of personal obligations to change behaviour will lead to individuals forming a broad goal or 'goal intention' to change their behaviour. The formation of a goal intention then leads an individual to the next stage of change, the contemplation stage. At the contemplation stage the individual wants to change their current behaviour but has no clear idea of how to do it or what alternative behaviours they should carry out instead. The task at this stage therefore is to get individuals to form clear behavioural intentions for an alternative behaviour that will replace the existing undesirable one. For example, this could be that in order to comply with the overall goal intention of wanting to reduce current meat consumption they could intend to act the behaviour of eating more vegetarian meals. The SSBC suggests that behavioural intentions are formed where there is a positive attitude about the new behaviour and an individual believes in their own ability to carry out the behaviour, this is drawn directly from Azjen's (1991) theory of planned behaviour. The formation of a clear behavioural intention then leads an individual to move to the next stage of change, the action stage. At the action stage an individual has a clear idea of the behaviour that they want to enact but may currently lack the specific skills or knowledge required in order to enact it successfully on a regular basis. For example, if an individual intends to eat more vegetarian meals but is unsure how to cook vegetarian meals that taste good or what restaurants provide vegetarian options that appeal to them then they are less likely to translate the behavioural intention into actual behaviour on a regular basis. Therefore, the task required of those individuals at the action stage is to be able to plan and enact the specific tasks required to meet their overall behavioural objective. For example, this could be finding vegetarian recipes that satisfy their taste and nutritional requirements, finding shops that stock the necessary alternative ingredients or researching different cafés to buy lunch from. These examples will contribute towards the formation of implementation intentions, which are the specifics and detail of how to enact a behavioural intention. For example, this could be to buy X ingredients from Y supermarket in order to cook vegetarian recipe Z on Tuesday evening. The formation of implementation intentions leads to the maintenance stage. The maintenance stage

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is the last of the stages of change where an individual is regularly enacting their new behaviour and had built up some level of resistance to relapsing back into their previous undesirable behaviour. The SSBC here is presented as a linear progression, however individuals can also regress back through the stages as they can progress forward through them, it is therefore far from certain that anyone who starts progressing through the stages of change will end up in the maintenance stage and regularly enacting the desired behaviour.

Social norms and the stages of change model

Social norms are represented in the SSBC as subjective norms, which are defined as an individual's perceptions of social pressure to enact or refrain from a certain behaviour (Azjen, 1991). Social norms are deemed to be an important factor in forming goal intentions, and as such are assumed to be important in moving individuals from the pre-contemplation to contemplation stage of change. The mechanism by which they are theorised to do this is that a supportive social norm will trigger a feeling of personal moral responsibility to change one's behaviour (personal norm) (Schwartz & Howard, 1981). The personal norm will then lead to the formation of a goal intention to change the existing behaviour. For example, if an individual deems that within their social group eating lots of meat is unacceptable then it may trigger a sense of personal responsibility to eat less meat and therefore, they will form an overall goal to reduce their meat consumption. In this sense the personal norm is still the focus of what needs to be triggered in order to form goal intentions and transition from the pre-contemplation stage. Personal norms have been shown to be effective levers to encourage sustainable consumer behaviours such as reducing car use (Abrahamse et al, 2009) water conservation (Harland et al, 1999 and energy conservation (Black et al, 1985). The norm activation model (Schwartz & Howard, 1981) theorizes that in addition to social norms individuals understanding of the consequences of their actions and feeling responsibility for the harm that they do leads to the formation of a moral compulsion to act (the personal norm). The value-belief norm theory of environmental behaviour extends this by suggesting that individuals with pro-social and pro-environmental values will be more likely to understand harmful environmental consequences of their behaviour and as such leads to them feeling responsible for environmental harm and feel a personal moral responsibility to change (Stern et al, 1999). It is important therefore to note that there are many factors involved in the formation of personal norms beyond the role of social norms. However, as the current research is focusing on the role of social norms at the different stages of behaviour change, we focus on personal norms only as a key mediating factor between salient social norms and the formation of goal intentions.

The second part of the SSBC model where social norms are notable is not through their inclusion but their omission. For the formation of behavioural intentions (that guide the transition between the contemplation and action stages) the constructs of the theory of planned behaviour (Azjen, 1991) are considered the predictors. However only attitudes and perceived behavioural control are included with the subjective norm (which forms part of Azjen's model) omitted. The reasoning for this is given by Bamberg (2013a) as when defined as the subjective norm, it is assumed to be a predictor of the personal norm and therefore an important factor in the first stage transition but not at the contemplation stage. There is empirical precedent for the omission of subjective norms as a predictor of behavioural intentions as meta-analysis have found their predictive value to be weak in comparison to the other constructs in

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the theory of planned behaviour (Armitage and Connor, 2001). However, it has also been argued that the weak effect can be attributed to the weak conceptualisation and measurement of the subjective norm in the model. This has also been empirically tested and distinguishing between different types of normative influence showed far greater impacts on behavioural intentions of descriptive social norms in particular (perceptions of what others are doing) (White et al, 2009).

For the transition between action and maintenance stages, social norms are not predicted as a key factor for the formation of implementation intentions. Therefore, it is currently assumed by the SSBC model that social norms do not play a role in moving from behavioural intentions to repeated actions. When conceptualised as subjective norms, it makes theoretical sense to include social norms only at the beginning of the stages of change model given the relevant theories used in the SSBC. However, we argue that due to the critique of subjective norms as a construct (Armitatge and Connor, 2001; White at al, 2009) that they do not accurately depict social normative pressures and therefore give only a limited explanation of the role that social norms play in progress through the SSBC model.

Proposing a modified stages of change model with injunctive, descriptive and trending norms

The crux of our theoretical contribution is that by taking an overly simplistic understanding of the role of social norms, the SSBC does not accurately represent their role at the different stages of behaviour change. We believe this to be an important oversite as social norms have been proven to be successful levers for encouraging sustainable consumer behaviours e.g. (Schultz et al, 2007; Goldstein et al, 2008; De Groot et al, 2013; White & Simpson, 2013) and as such understanding the role they have at the different stages of behaviour change is important as researchers and practitioners seek effective methods encourage the sustained behaviour changes required for significant environmental impact. Rather than adding complexity, we believe that the understanding the distinct role of different social norms at the different stages of change adds clarity to how social norms lead to behaviour change. In turn this clarity can help social marketers refine their use as part of creating more effective behaviour change campaigns.

The role of injunctive norms in the stages of change model

Injunctive norms effect individuals' perceptions of what they should or shouldn't do through them considering whether others around them will or won't be supportive or approving of their behaviour. Injunctive norms can therefore lead individuals to re-evaluate their current behaviour in the face of the potential for social disapproval for their current behaviour or potential for social approval by making a change. In the stages of change model, in the precontemplation stage the threshold for progressing to the next stage is the formation of a goal intention. Bamberg (2013) suggests that for this to happen an individual has to re-evaluate their current behaviour in order to kickstart a self-regulated process of behaviour change. We suggest that injunctive norms will play a role in getting individuals to re-evaluate their current behaviour and lead to them forming goal intentions to change. Furthermore, the norm activation model (Schwartz, 1981) shows that subjective social norms lead to the formation of a personal norm (personal moral obligations to change), with the personal norm being

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the key predictor of goal intentions in Bamberg's (2013) existing model. We therefore predict that injunctive norms will predict goal intentions when mediated by personal norms as well as directly.

H1: *Stronger injunctive norms about the acceptability of lowering meat consumption will lead to stronger goal intentions to reduce meat consumption.*

This is not the only role of injunctive norms in encouraging behaviour change, they have also been shown to have a 'reconstructive' on behaviour which carry on with recently adopted behaviours (Schultz et al, 2007). By acting as an indicator of social support for the target behaviour, we suggest that injunctive norms are useful in translating overall behavioural intentions into specific implementation plans. The motivating impact of social approval re-enforces that the target behaviour is indeed the correct thing to be doing and therefore can further confidence in a new behaviour that is currently unfamiliar and non-habitual. This we suggest means that an injunctive norm is likely to play a key role in predicting implementation intentions and as such if effective at moving individuals from the action to maintenance stage of change.

H2: *Stronger injunctive norms about the acceptability of lowering meat consumption will lead to stronger implementation intentions to reduce meat consumption*

The role of trending norms in the stages of change model

Trending norms have been shown to increase personal interest in undertaking sustainable consumer behaviours such as reducing meat consumption (Sparkman & Walton, 2017). This we suggest is in line with the task of forming goal intentions to move individuals from the pre-contemplation to contemplation stage of change. At the pre-contemplation stage the main task is to re-evaluate current behaviour and consider that there is an alternative that is worth perusing. By signalling that more people are undertaking a certain behaviour it can cause individuals to re-evaluate their own behaviour and as such increase their personal compulsion to change. Therefore, we would expect that a trending norm in favour of reducing meat consumption will lead to an increase in feelings of personal obligation to change current behaviour (Personal norm) and this will lead to the formation of goal intentions. Furthermore, trending norms cause individuals to re-evaluate what others find important or acceptable behaviour, therefore we also expect that stronger trending norms will lead to stronger injunctive norms, which in turn predict the formation of goal intentions to change current behaviour. Therefore, we predict that trending norms in favour of reducing meat consumption will lead to the formation of goal intentions to reduce meat consumption mediated by supportive injunctive norms and personal norms.

H3: *Stronger trending descriptive norms about the decrease in meat consumption will lead to stronger goal intentions to reduce meat consumption mediated by injunctive norms.*

However, given that injunctive norms are also 'reconstructive' in their nature and as set out above are predicted to increase implementation intentions to reduce meat consumption. We also predict that a supportive trending norm will lead to increased implementation intentions to reduce meat consumption as mediated by their effect on

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the injunctive norm. In short, as an increasing trend towards reducing meat consumption can lead individuals to deem this behaviour as more important to others around them, they will be more likely to implement their plans to reduce meat consumption due to the social benefits they perceive it will give them.

H4: *Stronger trending descriptive norms about the decrease in meat consumption will lead to stronger implementation intentions to reduce meat consumption.*

The role of descriptive norms in the stages of change model

Descriptive norms are distinguishable from injunctive and trending norms in that they have an ability to signal what is effective and adaptive behaviour in a given situation (Cialdini, 1990). They are particularly effective at when clearly providing an alternative behaviour in a given context, for example re-using hotel towels (Goldstein et al, 2008) or reducing littering (Cialdini, 1990). Furthermore, there is evidence supporting the role of descriptive norms in the formation of behavioural intentions (White et al, 2009). This is important due to Bamberg's exclusion of the subjective norm at the contemplation stage of the SSBC model due to the weak evidence linking subjective norms to the formation of behavioural intentions out of Azjen's (1991) theory of planned behaviour predictors. However White et al's (2009) evidence suggests that by distinguishing between the descriptive and injunctive norm as opposed to using the less clear subjective norm we find that descriptive norms are indeed an important predictor of behavioural intentions. The task at the contemplation stage of change is to turn an abstract goal to change behaviour into specific behavioural intentions to perform an alternative behaviour that is in line with the goal. Given that the descriptive norm can lead individuals to infer what is likely to be an effective behaviour in line with their pre-existing goal, we predict that descriptive norms will play a significant role in the formation of behavioural intentions and are therefore important for transitioning from the contemplation to action stage of change.

H5: *Stronger descriptive norms about the lower levels of meat consumption will lead to stronger behavioural intentions to reduce meat consumption*

Methods

Participants

Participants were initially invited through the participant finding website prolific.ac. They were asked to complete a short-standardized questionnaire assessing their current stage membership in relation to reducing their meat consumption as well as key demographics to assess their suitability for the study. From an initial response of 2000 participants, we first excluded those unsuitable for the study and then split initial respondents into their stage of change groups from their responses. We then selected a random sample but ensuring equal weights between the three stages of change of interest to us (pre-contemplation, contemplation action) resulting in an initial sample of 779. Participants who failed attention checks or did not complete required sections of the questionnaire were excluded from the analysis leaving a final sample of 595 (63% female, mean age: 37 years) that we used for our analyses. The sample was

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not representative and does not claim to be fully generalisable as the objective of the sample was to get even numbers of people in different stages of change with regard to reducing meat consumption so as to better understand the motivating factors at different stages of the process of behaviour change.

Design

Participants were invited to take part in a study about their diet. A cross-sectional survey design was used aiming to assess the core constructs of the SSBC model as well as measure different social norm types. The dependent variables in the study were the intention types (goal, behavioural and implementation) that signify what is required to move through the stages of change and the independent variables were the different norms that we hypothesise will predict the intention types.

Measurement

Both latent and manifest constructs were measures through questionnaire items shown in table 1, 2 items measuring the injunctive norm were removed as was 1 item measuring the descriptive norm and 1 item of the trending norm due to very poor factor loadings (<0.4) and the large impact they were having on reliability scores (alpha <0.5). After modifications all measures used showed acceptable reliability scores and factor loadings above 0.7. Goal, behavioural and implementation intention types were adapted from Klockner (2017) but using meat consumption instead of just beef consumption as the context for the items. The measures for injunctive, descriptive and trending descriptive norms were highly correlated, however we made the decision to keep them as separate constructs on the basis of the clear theoretical distinction between them.

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Table 1 – All factors included in measurement and structural models.

Variable	**Factor loading:**			**Reliability** *(Cronbach's Alpha)*
	Ind. 1	***Ind.2***	***Ind.3***	
Injunctive norm	***1***	**-**	**-**	**-**
Descriptive norm	***0.769***	***0.840***	**-**	***0.782***
Trending norm	***0.820***	***0.812***	**-**	***0.800***
Personal norm	***0.879***	***0.781***	***0.877***	***0.882***
Goal intention	***0.958***	***0.971***	**-**	***0.966***
Behavioural intention - Reduce	***0.909***	***0.972***	**-**	***0.939***
Behavioural intention - Vegetarian	***0.966***	***0.980***	**-**	***0.972***
Behavioural intention - Switch	***0.818***	***0.926***	**-**	***0.870***
Implementation intention - Reduce	***1***	**-**	**-**	**-**
Implementation intention – Vegetarian	***1***	**-**	**-**	**-**
Implementation intention - Switch	***1***	**-**	**-**	**-**

Data Analysis

All latent variable analysis was carried out in the structural equation modelling package lavaan in the Rstats program. Additional descriptive analyses were undertaken in SPSS v24. We first specified our measurement model to ensure acceptable fit and measurement of our constructs before conducting a test of our structural models of both the null model and our alternative hypothesised model.

Results

Test of the measurement model

We first performed a confirmatory factor analysis to check that our measurement model appropriately represented the theoretical constructs we propose to measure. Each measurement item was restricted to its designated factor and all factors were allowed to correlate with each other. Our proposed measurement model differs from Bamberg's (2013) theoretical model in two key ways. Firstly, we distinguish between different types of social norms rather than just including one construct. Secondly, whereas Bamberg (2013) specifies one type of behavioural and implementation intention to move through the SSBC model, we follow Klockner's (2017) modified model where different behavioural and implementation intentions can lead to progression through the stages of change toward lasting behavioural change. Table 2 shows a comparison of three measurement models that are designed to see whether

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the distinction between different social norms and intentions leads to a significantly better model fit.
Alternative model 1 takes a simplified measure of behavioural and implementation intentions removing the different strategies included in the measures shown in table 1. Instead we coded all six behavioural intention items measuring overall behavioural intention to reduce meat consumption and all three implementation intention items measuring implementation intentions to reduce meat consumption.
Alternative model 2 takes a simplified measure of social norms, instead of distinguishing between injunctive, descriptive and trending norms we instead code all the items to one social norm measure. We also tested a single factor model in order to establish the probability of common method variance in the measurement model. Common method variance can arise when different constructs in a model are measured at a single point in time and using similar methods of measurement as they are in this study (Podsakov, 2003). We therefore assessed the comparative fit of a single factor model compared to the proposed measurement model (a variation of Harman's single-factor test used in CFA). If common method variance is responsible for a significant amount of covariation between the factors, a single factor model will show strong fit indices in the measurement model (Podsakov & Organ, 1986). The results in Table 2 show that this is not the case and therefore the probability of common method variance is minimised. This test doesn't however rule out the possibility of any effect due to common method variance (Podsakov et al, 2003), however in the case of this dataset more robust measures of common method variance such as controlling for the effective of a single unmeasured latent method factor is not possible as it would cause a model specification error due to the limited number of manifest variables in the model. We can therefore conclude that whilst common method variance is minimally probable in this dataset, we cannot measure its presence and therefore correct for it.

Overall, the model fit statistics (Table 2) show that our proposed measurement model shows a significant improvement in model fit over the simplified alternative models. The overall model fit is good according to (Hair et al, 2019) with satisfactory values across multiple absolute and incremental fit indices. We were satisfied that our proposed measurement model accurately represented our data and therefore use this as the basis for our structural analysis.

Table 2 – Measurement model comparisons

Model	RMSEA (90% C.I)	SRMR	CFI	TLI	ECVI	AIC	X2 (df)
Proposed Measurement model	0.028 (0.018, 0.037) P=1	0.017	0.995	0.992	0.548	33410.76	148.137 (101) P=0.002
Alternative model 1 (all norms & simplified intentions)	0.143 (0.137, 0.149) P<0.001	0.078	0.834	0.785	3.107	34933.01	1732.388 (132) P<0.001

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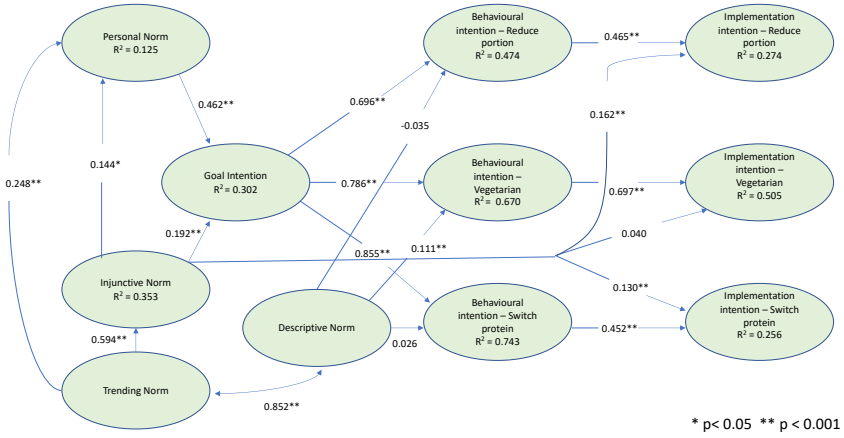
Alternative model 2 (simplified norms & all intentions)	0.043 (0.035, 0.050) P=0.945	0.041	0.987	0.981	0.656	33474.91	248.286 (119) P<0.001
Single Factor model	0.221 (0.215, 0.227) P<0.001	0.115	0.609	0.553	6.115	33299.934	3570.369 (110) P<0.001

Test of Theoretical Model and the Predictive Power of Norms.

Overall model fit

Fig. 1 shows the results of our structural model (using ML estimator & covariance matrix shown in Appendix 1) aimed at testing our overall theoretical model of social norms and the intention types that guide transitions between the stages of change. Overall model fit was deemed acceptable using guidelines set out by (Hair et al, 2019) (X^2 = 406.631. df = 135, p <0.001; CFI = 0.972; TLI = 0.964; RMSEA = 0.058, 90%C.I = 0.052, 0065, p = 0.019; SRMR = 0.072). Trending norms and descriptive norms were allowed to covary in the model due to the high correlation between the two, however they were kept as separate measures due to the theoretical distinction between the two. The different implementation intention types were also allowed to covary in the final model due to the high correlations between the two, but again were kept as distinct measures to represent the different plans that can be made independently to reduce meat consumption. A review of the modification indices did not suggest any modifications to the model that were justifiable theoretically.



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Predictive power of injunctive norms

Our SEM model (Fig.1) shows Injunctive norms to significantly predict variance in goal intentions to reduce meat consumption both directly and indirectly when mediated by personal norms. The overall R^2 value shows that only a relatively low explanatory effect of injunctive and personal norms on goal intentions to reduce meat consumption, however this is somewhat expected due to the omission of other variables known to predict goal intentions as part of Bamberg's (2013) model. The aim of this study was to focus exclusively on the predictive power of social norms and the model shows that Injunctive norms do play a significant role in the formation of goal intentions. Therefore, we find strong support for H1.

The results for the predictive value of injunctive norms on implementation intentions to reduce meat consumption were less conclusive. Injunctive norms were shown to significantly predict implementation intentions to reduce meat portion sizes and switch to different protein sources, however they did not significantly predict implementation intentions to eat more vegetarian meals. Conversely overall amount of variance explained by injunctive norms and the relevant behavioural intentions was low for switching and reducing implementation intentions but moderate for vegetarian meal implementation intentions. Therefore, we find partial support for H2 as injunctive norms significantly predict 2 of our 3 implementation intentions aimed at reducing meat consumption.

Predictive power of trending norms

Our SEM model (Fig.1) shows trending descriptive norms are significantly associated with goal intentions, this relationship is mediated by both injunctive norms and personal norms, with trending injunctive norms associating with personal norms directly and when mediated by injunctive norms. However, the R^2 values suggest that the explained variance in personal norms is only negligible with only the different social norms as predictors. Therefore, we find strong support for H4.

The model also shows that when mediated by injunctive norms, trending descriptive norms are significantly associated with implementation intentions to reduce meat portion sizes and switch to other proteins but not to eat more vegetarian meals. Therefore, we find partial support for H5.

Predictive power of descriptive norms

Our SEM model (Fig.1) shows that descriptive norms are significantly associated with behavioural intentions to eat more vegetarian meals, but not behavioural intentions to switch to other proteins or reduce meat portion sizes. Therefore, we only find partial support for H6.

Discussion of causality in the structural model

The proposed causal relationships tested in the structural model are based on the theoretical and logical assumptions reviewed in the literature review of this paper. However, the use of a cross sectional research design, and with it the lack of temporal lags in the data collection raises the potential of reverse causality and simultaneity in the structural model. Whilst we cannot empirically exclude the possibility of alternative directionality of the relationships proposed, there is existing literature in longitudinal

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settings across different behavioural contexts which has established that the movement from goal to behavioural to implementation intentions within the SSBC model results in behaviour changes (Bamberg, 2013b; Klockner; 2014; Klockner & Ofstad, 2017). Furthermore, the directionality of the relationship between different social norms and behaviours has been established across many different experimental studies across different behavioural contexts (e.g Cialdini et al, 1990; Schultz et al, 2007; Goldstein et al, 2008; Allcott, 2011; White & Simpson, 2013). Therefore, whilst we do not test explicitly for the presence of reverse causality within the results of the model we contest that the relationships tested in this structural model are a logical extension of the causal relationships between intention types and behaviour as well as social norms and behaviour that have been tested in prior causal research, including in Chapter 3 of this thesis.

Discussion

General Discussion

Our study has found significant relationships that show that different types of social norms become more relevant at particular stages of change. We found strong or partial support for all of our predicted relationships in our model set out in Fig.1. In addition to this there was good fit for our overall theoretical model. We believe therefore that when social norms are distinguished into injunctive, trending and descriptive norms that they play a role at each of the key transitions in the stages of change process. Injunctive norms were significantly associated with the formation of goal intentions, both directly and when mediated by personal norms. This suggests that as predicted an individual's perceptions of what is a socially acceptable behaviour can cause individuals to re-evaluate their current behaviour and set goals to change their current behaviour. The ability to influence the formation of goal intentions means that injunctive norms in favour of the target behaviour can kickstart the behaviour change process by helping move individuals from the pre-contemplation to contemplation stage of change. Of course, this is only the first step and may not lead to actual behaviour change ultimately, but it is an important part of the process if people are to change their habitual and hard to shift unsustainable consumer behaviours such as eating large amounts of meat.

Similarly, trending norms were shown to play a key role in the formation of goal intentions due to their significant role in the formation of supportive injunctive norms and personal norms to reduce meat consumption. This suggests that individuals' perceptions of how others are changing their behaviour effects their perceptions of what others deem acceptable, what they have a personal obligation to do and ultimately forming a general goal to change their behaviour. Trending norms are therefore also an important factor in the process of individuals re-evaluating their current behaviour and as such we conclude are an important factor in getting individuals to transition from the pre-contemplation to contemplation stage of change.

In addition to their role in the formation of goal intentions, injunctive norms were effective predictors of implementation intentions to reduce meat portion sizes and switching to other proteins, but not eating more vegetarian meals. This result is broadly in line with our predictions and shows that injunctive norms can provide the social

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support required to form specific plans that are in line with behavioural intentions. As such we suggest that injunctive norms are playing an important role in the translation of behavioural intentions to specific plans to enact that behaviour and as such these more specific plans are likely to lead to actual behaviour change. Again, given that trending norms significantly predicted the variance in injunctive norms they are also indirectly a key factor in the formation of implementation intentions.

There was some support in our model for the role of descriptive norms in predicting behavioural intentions. Descriptive norms significantly predicted behavioural intentions to eat more vegetarian meals but not behavioural intentions to reduce meat portion sizes or switching to other proteins. A potential explanation for this finding is the participants interpretation of our descriptive norm items. When asked about their perceptions of others meat consumption it may be easier to determine when others around you are eating vegetarian meals than it is to discern smaller portion sizes or a different protein in a meat-based meal. Given that we predicted descriptive norms would affect behavioural intentions due to their ability to impart information about effective behaviour, the specific meat reducing behaviour that they perceive to be happening around them is likely to be important in determining which behavioural strategy they choose. This is because it can signal what is likely the most effective way to act in line with their goal intention to change their existing behaviour.

Theoretical Implications

Our study set out to show that by representing social norms as a subjective norm only in the SSBC model, it currently underestimated the role that different social norms play at the different stages of change. Our results show that this was indeed the case and that different social norms play an important role in the formation of different intentions that lead to progress through the stages of change. The SSBC has shown to be a promising model for both explaining different sustainable consumer behaviours (Bamberg, 2013; Klockner, 2014; Klockner, 2017) as well as a basis for designing targeted interventions that are more effective than generalised approaches to encourage behaviour change (Bamberg, 2013b; Klockner & Ofstad, 2017). We believe that we have contributed to this growing literature by showing how taking a 'multiple norms approach' (White et al, 2009) as opposed to a single broad social norm definition used in the SSBC to this date we have firstly: expanded on the explanatory power of the SSBC model by showing a fuller understanding of the role of social norms at the different stages of change, and secondly have suggested where different social norms interventions can be tailored to individuals at different stages of change.

Furthermore, by investigating the effects of social norms at the different stages of behaviour change, we have added to the body of knowledge that focusses on how different social norms lead to behaviour changes in certain scenarios and not others (White & Simpson, 2013; Jacobson et al, 2011; Melnyk et al 2011; Melnyk et al 2013). We already have clear evidence for the 'reconstructive' power of injunctive norms (Schultz et al, 2007; Schultz et al, 2018) suggesting that supportive injunctive norms can re-affirm individual's behaviour change in the face perceived inaction from others around them. Our research suggests that a novel mechanism for why this is the case, through their ability to lead to individuals forming implementation intentions. Implementation intentions are a key factor in individuals translating behavioural intentions to actual behaviour, and so therefore we suggest that injunctive norms can

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play an important role in reducing the intention-behaviour gap that is a common problem in sustainable consumer behaviour research. Moreover, we have added to a growing body of recent research that looks at the potential for harnessing trends in behaviour (through trending norms) to encourage sustainable consumer behaviours (Sparkman & Walton, 2017; Mortensen et al, 2019). We provide further evidence that a supportive trending norm is positively associated with supportive injunctive norms thus providing further validation for Sparkman & Waltons (2017) research. In addition to this replication we have also suggested a novel mechanism for how trending norms influence behaviour change at the different stages of behaviour change and therefore suggest how they can be targeted most effectively to encourage sustainable consumer behaviours.

Implications for Encouraging Sustainable Consumer Behaviours

The stages of change model is designed to suggest how individuals move through the stages of change and also what factors are important at each stage to move individuals forward towards lasting behaviour change. In the practice of encouraging sustainable consumer behaviours, understanding how to shift repeated habitual behaviours and encouraging lasting change is a valuable commodity. The current research adds specific options for encouraging such changes through harnessing the power of social norms. By showing their role in encouraging both goal and implementation intentions, our research suggests that injunctive norms can be harnessed to encourage both individuals who are currently not considering behaviour change to consider it, as well as encouraging those who intend to change to implement that change. Our research suggests that by focussing injunctive norm interventions on these specific tasks as part of the behaviour change process that they are more likely to be effective at reaching behaviour change objectives.

In many sustainable consumer behaviour contexts, there may be a lack of significant public support to be able to harness the power of injunctive norms directly as part of interventions. However, our research has shown that the use of positive trends in behaviour can be harnessed to indirectly effect the formation of goal and implementation intentions to change by changing individuals' perceptions of what is a commonly accepted behaviour (the injunctive norm). This is particularly relevant in the case of meat consumption where there is still a significant majority of people that eat a large quantity of meat in the UK and where eating large amounts of meat is still generally seen as an acceptable or even positive thing to do. By making use of the fact that even though it is still a significant minority overall, more people are eating less meat over time, this can change individuals' perceptions of the acceptability of eating less meat. In turn this may encourage those who aren't considering changing their meat consumption to change, as well as encouraging those who are going through the process of change to a lower meat diet to continue doing so.

Finally, our research has found some support for using the power of descriptive norms to indicate what is an effective behaviour to undertake to act in line with overall goals. This is potentially very important in a practical sense whereby many individuals want to act in a more sustainable way but face significant complexity (Longo et al, 2019). Descriptive norms when clear can provide information about effective ways to act in line with broader goals. For example if individuals want to eat a more environmentally friendly diet but are unsure which of the many different ways in which they could do

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this to try themselves, information about what others are doing in the same situation as them can be helpful in getting them past the stage of just having a broad goal to actually forming a specific intention to try something that will fulfil their goal. In summary we believe that the main practical implications of our research are that different types of social norms can be used more effectively in behaviour change campaigns when they are clearly linked to the objective of the campaign. If the target is individuals who are currently not considering changing their current behaviour at all then our research would suggest harnessing the injunctive or trending norm in the campaign. If the target is individuals who want to change but are unsure how or what the alternatives are then descriptive norms are likely to be the most effective social norm approach. Given that harnessing social norms in behaviour change campaigns has sometimes not led to the desired results e.g. (Harries et al, 2013; Bohner & Schluter, 2014), we believe that providing more clarity on when norms should be used is important to increase the likelihood, they are effective in practice.

Conclusion

The current research set out to clarify the role that social norms play in the stages of change model by investigating the role of different social norms in the process of behaviour change beyond the subjective norm. Our research has found that by distinguishing between injunctive, descriptive and trending norms that not only do social norms play more of a role at different stages of change than had previously been theorised, but also each norm differs in its role. These differences in the role that injunctive, descriptive and trending norms play in the stages of behaviour change has also added to an existing body of knowledge that asks when different types of social norms are more or less effective at encouraging behaviour change. Overall our results showed good support for our proposed theory, however we believe that future research should address each of our proposed relationships more thoroughly. In particular we would suggest that further research is required to link our findings to actual behaviour change so that our proposed relationships in the SSBC model are also shown to end up in actual behaviour change.

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Chapter 5 – Conclusion

Introduction

This thesis set out to answer the question '*How do social norms guide individuals through the stages of change to lasting sustainable consumer behaviour changes?'* and through the three research papers presented has gone some way towards answering it. Firstly, in Chapter 2 we looked at how descriptive and injunctive norm manipulations effected the goal, behavioural and implementation intentions that guide people through the process of sustainable consumer behaviour changes. Our findings did not provide conclusive evidence of the effectiveness of normative interventions, however a regression analysis showed that whilst the injunctive norm was significantly associated with the formation of the intentions, the descriptive norm was not. Chapter 2 also provided the first evidence suggesting that injunctive norms played a role in to process of behaviour change beyond the formation of goal intentions, as they were also significantly associated with the formation of implementation intentions. With our evidence suggesting the role of injunctive norms in the stages of change was larger than had been theorised in the stages of change to this point, we then looked to investigate this relationship further in Chapter 3.

Our second research paper conducted a 3 week long field experiment looking at the impact of an injunctive norm manipulation on meat eating behaviour, the intentions that guide individuals through the stages of change and movement between the stages of change over time. We found that injunctive norms were significantly more effective at reducing the proportion of meat that individuals ate than information only, and a borderline significant interaction showed that the reduction was more pronounced when the injunctive norm was targeted at those in the pre-contemplation and action stages of change. This suggested to us that not only can injunctive norms be used as an effective lever for lasting behaviour change but also that they are more effective when targeted to individuals at certain stages of change.

In Chapter 4, our third research paper looked to more comprehensively account for three separate types of norms role in the stages of behaviour change; injunctive norms, descriptive norms were all predicted to have a unique role in the process of moving individuals through the stages of change towards lasting sustainable consumer behaviours. The data analysed in Chapter 4 provided good evidence of the unique roles of norms as the different stages of change and as such allowed us to go some way towards answering the overarching research question that we set out to investigate in Chapter 1.

We believe that through the contributions of our three research papers we have developed our understanding of the role of how social norms guide individuals through the stages of change towards sustainable consumer behaviour changes and this final chapter will summarise our key findings and discuss the impact on the literature we set out to contribute to in Chapter 1.

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Discussion

Our central theoretical argument at the outset of this research project was that the suggested role of the subjective norm in the stages of change model inadequately represented the role that social norms play in the process of behaviour change. Over the three research papers presented in this thesis we have made specific theoretical contributions that show different social norms impacting change throughout the stages of change and how individuals at different stages of change respond differently to social norms based upon the stage of change they are currently in.

Injunctive norms predict goal intentions

Our first key contribution, for which there was supporting evidence across all three papers was that injunctive norms have an important role not only at instigating the start of the stages of change process by leading to the formation of goal intentions, but also in encourage repeated and lasting behaviour through their role in the formation of implementation intentions. The existing SSBC theory suggested that the subjective norm predicted personal norms and that strong personal norms lead to the formation of goal intentions to change behaviour (Bamberg, 2013). However, beyond the pre-contemplation stage, the role of subjective norms was minimized, in particular being eschewed as a predictor in the theory of planned behaviour (Azjen, 1991) which was used as the theoretical basis for predicting behavioural intentions in the SSBC model.

We suggested that the way that the subjective norm is conceptualised is closer in operation and to the definition of the injunctive norm than the descriptive norm according to the focus theory of normative conduct (Cialdini, 1990; Cialdini, 1991). The distinction is important due to the different ways in which that injunctive and descriptive norms impact behaviour (Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013) and we suggested that these different impacts implied different roles in the stages of behaviour change.

Injunctive norms were predicted to impact on goal intentions to reduce meat consumption in much the same way that subjective norms had already been theorised to do so. The main goal at the pre-contemplation is to re-evaluate current behaviour. Injunctive norms suggest to individuals what are acceptable behaviours to undertake. Perceiving that others may not support ongoing high levels of meat consumption, or that they may react positively to reducing meat consumption can lead individuals to re-evaluate what is the best thing for them to be doing. The normative effect of injunctive norms is motivating as we are social beings and want others who we care about to like us (Deutch & Gerrard, 1955), therefore we are likely to make an effort to conform with behaviours that we think others would approve of. Moreover, our perceptions of what others think is the right thing to do impacts on our personal perceptions of what the right thing to do it (Schwartz & Howard, 1981). According to the SSBC model when individuals notice that their current behaviour is not in line with what their personal morals suggest is the right thing to do, they experience negative emotions toward their current behaviour and form goals to change it (Bamberg, 2013).

In Chapter 2 our regression results showed that injunctive norms supportive of reducing meat consumption were significantly associated with stronger goal intentions to reduce meat consumption. This result was replicated in our structural equation

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model in Chapter 4 and also provided evidence for the path by which they impact goal intentions as they were also significantly associated with the formation of personal norms, which in turn predicted stronger goal intentions. The behavioural implications of the importance of this role of injunctive norms were explored in Chapter 3 where the injunctive norm message led to a significant reduction of the proportion of meat those who started the study in the pre-contemplation of stage ate. The implication that we took from this behavioural finding was that the injunctive norm was more effective than information only at getting individuals to re-evaluate their current behaviour and as such start moving through the stages of change towards actual behaviour changes. In summary we believe that we found strong evidence for the role of injunctive norms in the formation of goal intentions and believe that given the importance of distinguishing between descriptive and injunctive norms, injunctive norms should take the place of subjective norms in the SSBC model in predicting goal intentions.

Injunctive norms predict implementation intentions

In addition to the above finding, and in contrast to the existing SSBC model, we also found strong evidence supporting the role of injunctive norms in leading to the formation of implementation intentions to reduce meat consumption. This would imply that injunctive norms could be effectively targeted at those in the action stage of change to try and move them to the maintenance stage and thus increase the likelihood of them continuing to enact the sustainable consumer behaviour. The theoretical argument that this would be the case stems partially from the findings of (Schultz et al, 2007) that individuals can be encouraged to continue sustainable consumer behaviours when they are aware of the social approval of the behaviour even when those around them are not acting sustainably. The transition from the action to maintenance stages of change is guided by the ability to form strong implementation intentions that set out the specifics of how to enact the new behaviour. In addition to acquiring the knowledge and abilities to enact the new behaviour, individuals must also have the confidence and motivation to continue new behaviours where they are likely to encounter problems (Bamberg, 2013). When individuals perceive that their actions to act sustainably are contrary to what most others are doing, their behaviour can relapse back to more unsustainable behaviour, they regress to the norm (Schultz et al, 2007). However, when social support through the injunctive norm is shown to individuals, this relapse doesn't happen and as such the behaviour continues.

We suggested that the injunctive norm caused this continued sustainable behaviour by its ability to encourage individuals to form implementation intentions. In Chapter 2 our regression analysis showed that there was a significant association between injunctive norms and implementation intentions. Chapter 4 provided further support for this finding by showing that injunctive norms were significantly associated with 2 of the 3 implementation strategies that we measured aimed at reducing meat consumption. In Chapter 3, our experimental analysis showed that those individuals exposed to an injunctive norm intervention that were in the action stage of change reduced the proportion of meat in their diet more than those in the information only condition. Furthermore, the effect was stronger on those individuals in the action stage of change (where implementation intentions signify movement to the next stage) that it was on individuals in the contemplation stage (where behavioural intentions signify movement to the next stage). Overall believe we have found a compelling body of evidence that

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injunctive norms are an important factor influencing implementations and as such transitions from the action to contemplation stages of change. Given that our research has found injunctive norms effective levers in the behaviour change process both at the pre-contemplation and action stages, we believe that injunctive norm interventions are well suited to encouraging longer term behaviour changes where behaviours are regularly repeated such as in our diet, travel or energy uses. In other words, our evidence suggests that through their dual role in progressing individuals through the stages of change, injunctive norms can be an effective part of interventions aimed at changing some of the most impactful unsustainable behaviours individuals currently undertake.

Descriptive norms and their relationship with behavioural intentions

With regard to descriptive norms, we focussed their ability to impart informational social influence (Deutch & Gerrard, 1955) that effects individuals' perceptions about what is an effective behaviour to undertake. For this reason, we proposed that they would play a key role in the formation of specific behavioural intentions and as such the transition between the contemplation and action stages of change. At the action stage of change, in order to progress and individual must decide on a specific behavioural strategy that allows them to act in line with their goal to change their existing unsustainable behaviour. We suggested that if individuals perceive others around to be undertaking a particular behaviour that is in line with their goal to change their behaviour then they are likely to choose that particular way of acting. For example if individuals have an overall goal of reducing their meat consumption and they perceive that many people they know are adopting a flexitarian diet in order to reduce their meat consumption then they are more likely to adopt the flexitarian diet strategy rather than other strategies such as going completely vegetarian or vegan to reduce their meat consumption. That they perceive many others around them have a flexitarian diet and not a vegan or vegetarian diet is likely to lead them to believe that the flexitarian diet is an effective and proven way of reducing meat consumption and therefore they are more likely to form a behavioural intention to act in that way than other strategies. In contexts such as dietary change where there are so many different options for behaviour change, we suggested that the clarity of the most effective strategies that descriptive norms could provide would lead to stronger behavioural intentions.

We found some evidence to support our proposals, but our findings were not conclusive. In Chapter 4 we found that descriptive norms significantly predicted behavioural intentions to eat more vegetarian meals, but not to reduce meat portion sizes or to switch to other proteins. Also somewhat contradicting this finding was our results in Chapter 2 where the regression analysis did not find descriptive norms to be a significant predictor of goal, behavioural or implementation intentions. In this sense we would categorize our results as part of several studies that haven't found descriptive norms to be effective lever to change behaviour (Bohner & Schluter, 2014; Harries et al, 2013). There are many potential reasons for why this would be the case, and also explanations that our proposals of where the descriptive norm effects progress through the stages of change may hold through in different contexts. Firstly, only a small minority of people in the UK actually abstain from eating meat altogether, whilst more consider themselves to be flexitarian or 'meat reducers' this may be a behaviour that is difficult for individuals to judge what others around them are actually

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doing in terms of the amount of meat that they eat. Therefore, in the case of Chapter 2, it is potentially the case that our descriptive norm manipulation was not seen as plausible due to the fact that in the UK, people on aggregate do eat a lot of meat and so this perception stayed salient in the participants. The fact that our manipulation checks suggested that the injunctive norm was not only stronger overall in support of reducing meat consumption but that the descriptive norm condition also resulted in a greater change in injunctive norms than descriptive norms. That the context in which we were studying is so overwhelmingly full of meat eaters has made it difficult to manipulate or find individuals to perceive low meat diets as something that is commonly done.

Another potential reason for why descriptive norms didn't show many significant effects in our studies was the reference group which we used to measure and manipulate the descriptive norm. Given that both studies where the descriptive norm was used (in Chapter 2 and Chapter 4) the sample was taken from individuals all over the UK, from a variety of backgrounds, ages and locations, the reference group for the descriptive norm was perceptions of what others in the UK are doing. The social identity perspective suggests that descriptive norms are more effective at manipulating individuals' behaviours when the norm refers to a reference group that an individual closely identifies with (Hogg, 2003; Smith & Louis, 2008). For example, in the case of our studies, if we had been able to conduct a study exclusively on a university campus and measured or manipulated individuals perceptions of what other students at that university were doing, it would be expected to have a greater impact on behaviour than perceptions about what individuals in the UK as a whole are doing. The reason for this being that we would expect students at a particular university to identify more strongly with others at their university than the wider population. Therefore, it is likely to motivate someone more to enact a certain behaviour if they perceive 'people like me' are behaving in a certain way rather than people in general.

In part our predicted role of descriptive norms can also potentially explain the lack of consistent effects in our studies. We theorized that descriptive norms would assist individuals in the contemplation stage of change to form specific behavioural intentions to reduce meat consumption. However as was acknowledged by our measurement of different behavioural intentions in Chapter 4, there are different strategies that can be used to reduce meat consumption overall. It could be that if our descriptive norm measures were specifically targeted to these different strategies rather than the overall outcome, i.e. 'the majority of other people eat more vegetarian meals' rather than 'the majority of other people eat less meat', we would have seen a clearer link between the specific norm to specific behavioural intentions. We theorised that descriptive norms would be effective at this task due to their ability what is an effective way to act that would be in line with already formed goal intentions. Therefore, it follows that the norm should target as specific behaviour as possible so to be clear about a particular behavioural strategy and therefore make it more likely that a strong behavioural intention is formed for a specific new behaviour so that individuals can continue to progress through the stages of change.

Although our research did not find conclusive evidence of the role of descriptive norms in the stages of change model, we believe that future research where the norm is more specific in terms of the reference group and/or a specific behavioural strategy could shed further light on their role in the stages of change model.

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The role of trending norms in the stages of change

In Chapter 4 we explored how trending descriptive norms would differ in their role from static descriptive norms in terms of their role in the stage of change model. Trending norms differ from our existing definition of descriptive norms in that they are individuals' perceptions of the dynamics of a specific behaviour (are more or less people doing it?) as opposed to the descriptive norms focus on perceptions of what is being done right now (Sparkman & Walton, 2017; Mortensen et al, 2019). We suggested that the trending norm is therefore particularly relevant in the sustainability context whereby it is often the case that only a minority of individuals undertaking sustainable consumer behaviours, but the trend is that more people are behaving sustainably over time. Therefore, an understanding of how these trends can be harnessed to engender yet more change toward sustainable consumer behaviours could be particularly useful for designing behaviour change campaigns.

Building on results reported by Sparkman & Walton (2017) our results reported in Chapter 4 found trending descriptive norms to be significantly associated to injunctive norms. This evidence suggests that individuals' perceptions of what the trend of a specific behaviour is changes their perceptions of how acceptable the behaviour is in the same social context. In this case, perceiving that more people are adopting meat reducing diets leads to individuals perceiving that meat reducing diets are more socially acceptable. However, whereas Sparkman & Walton (2017) showed on how this mechanism leads individuals to personal interest in eating less meat and therefore results in behaviour change, we propose how trending norms play a role at different stages in the process of behaviour change. Also, whilst Sparkman & Walton (2017) looked at how repeated trending norm messages can lead to continued sustainable consumer behaviour, explaining their role in a self-regulated behaviour change process can show how they can lead to progress through the stages of change towards maintenance of that new behaviour. If we instead frame how trending norm interventions can be used to move individuals to the maintenance stage of change then we negate the need for repeated interventions to encourage continued sustainable consumer behaviours.

Our structural model in Chapter 4 showed a good overall model fit and significant paths between trending norms to injunctive norms and then injunctive norms to both goal intentions and implementation intentions. This suggests that individuals' perceptions of how others behaviour can play an important role in getting them to re-evaluate their current behaviour in the pre-contemplation stage and as such can potentially be leveraged to encourage individuals to form goals to change their current unsustainable behaviours. Also, for individuals in the pre-contemplation stage, we found that trending norms are significantly associated with personal norms about reducing meat consumption. This suggests that when individuals perceive that more people around them are acting sustainably, it not only impacts how they perceive others will approve of but also what they consider to be the morally right thing to do themselves. Therefore, our structural analysis shows two ways in which the trend of a sustainable consumer behaviour can trigger re-evaluating current behaviour and kickstart an individual going through a self-regulated process of behaviour change themselves.

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In addition to trending norms impact in the formation of goal intentions, the structural analysis also showed a path for their impact on implementation intentions. Again, this is through the injunctive norm, whereby as a positive trend in sustainable consumer behaviours leads to more positive perceptions that the behaviour will be approved of by others. The social approval factor then has a galvanising effect on the behaviour change and therefore encourages individuals to implement their behavioural intentions to perform sustainable consumer behaviours and as such leads to repeated sustainable consumer behaviours.

In summary our findings showed that via an indirect path, trending norms can not only encourage individuals to begin the process of behaviour change to sustainable consumer behaviour but also to continue that behaviour once they have started to create lasting behaviour change.

How Social Norms Differ, and Align in Encouraging Sustainable Consumer Behaviours

Through investigating the role of both descriptive (trending and static) and injunctive norms impact on individual at different stages of change, we have added to a body of literature which suggests when norms should be deployed for maximum effect (Schultz et al, 2007; Jacobson et al, 2011; White & Simpson, 2013; Melnyk et al, 2013). We have found evidence that suggests that injunctive and descriptive norms encourage individuals through the SSBC model very differently, with significant evidence of the power of injunctive norms in encouraging behaviour change for individuals in the pre-contemplation and action stages and some evidence of the power of descriptive norms to encourage progress through the stages for those in the contemplation stage. This provides yet more evidence that injunctive and descriptive norms impact behaviours in different ways and it should therefore be considered which norm will be most effective at encouraging behaviour change dependent on the context.

Furthermore, by suggesting that different social norms have roles at different parts of the SSBC model, we are also lending theoretical support for the effectiveness of aligned social norms in encouraging sustainable consumer behaviours (Schultz et al, 2008). The reason for this being that if injunctive norms best encourage those in the pre-contemplation and action stages of change, whilst descriptive norms encourage individuals at the contemplation stage of change, then between the two norm types they can encourage individuals at each stage of change to progress towards behaviour change. Yet also, when descriptive norms and injunctive norms are not aligned, particularly when descriptive norms are not supportive of the target behaviour as is the case in many sustainability applications, then trending norms also provide and alternative model to encourage individuals to move through the stages of change.

How can the findings of this thesis explain prior inconsistencies in the effects of social norms?

One of the motivations for this thesis set out in chapter one was to try and resolve prior inconsistencies in the results of social norms interventions (e.g. Bohner & Schluter, 2014; Harries et al, 2013).The key relationships between social norms, stages of

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behaviour change and intention types above suggest a previously unexplored reasoning for these observed inconsistencies. In Chapter 2, 3 and 4 we have demonstrated that an individual's current stage of change in relation to a complex repeated behaviour has an impact on different social norms ability to affect both intentions (Chapter 2 & 4) and behaviour (Chapter 3). These results imply that understanding an individual's stage in the process of behaviour change of a specific behaviour is important to understanding the likely effectiveness of the social norm on behaviour change. Therefore, as previous studies have not measured an individual's stage of change before administering normative interventions and measuring their behavioural impacts, we cannot know the potentially crucial differences in populations stage of change distribution that would impact on the overall effect of the norm on behaviour. In the case of Harries and colleagues' study (2013) whereby the target behaviour was energy usage, it can be argued that as the target behaviour is repeated, complex and multifaceted it requires significant self-regulation on behalf of the individual in order to create meaningful and lasting behaviour changes. Whilst social norms can can lead to behaviour change without the need for conscious reasoning (e.g. Haidt, 2011; Aarts & Dijksterhuis, 2003; Nolan et al, 2008), in the case of behaviours such as long term energy usage we have argued in this thesis that a conscious effort by the individual is required in such contexts. Therefore, this thesis makes a contribution to the literature by providing evidence that when behaviour change occurs through a process of effortful self-regulation, that social norms need to be targeted to have the greatest impact on behaviour. The implication being that when particular behaviour changes are guided through a deliberative stage based process of change (as is likely to be the case with repeated behaviours such as diet, energy usage and travel), that social norm interventions will yield inconsistent results on behaviour depending on the stage of change of the individuals being targeted. We suggest that future research in such behavioural contexts should endeavour to understand individual's movement through the stages of change when targeting social norms interventions so as to minimise the possibility of inconsistent results.

Conclusion

In this thesis we have provided a body of evidence that supports our challenge of the existing assumptions of the SSBC model and proposes a different role for social norms in encouraging individuals through the stages of change. Furthermore, we have contributed to social norms theory by suggesting when different social norms are or are not effective at encouraging sustainable consumer behaviours with a novel theoretical explanation up until now unexplored using the SSBC model. Injunctive norms not only encourage individuals to kickstart a self-regulated process of behaviour change for those not currently considering it, but they also encourage those going through the process of behaviour change to keep at it, causing lasting behaviour changes. Furthermore, trending norms through their impact on injunctive norms have the potential to also encourage individuals to progress through the stages of change towards sustainable consumer behaviours. We were able to provide less clarity on the role of descriptive norms in the SSBC model and so we recommend more research to understanding how descriptive norms are (or aren't) able to encourage individuals to progress through a deliberative behaviour change process.

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The current thesis has also taken a relatively recent theoretical model in the SSBC and applied it in a different context (meat consumption in the UK) and found support for its main assumptions by showing how intention types and actual behaviour differ in individuals at different stages of the behaviour change process. Also, by showing that injunctive norms become more or less effective at encouraging individuals to reduce their meat consumption depending on the stage of change they are currently at, we provide support for one of the key assumptions of the SSBC model. That is by tailoring interventions to the stage of change an individual is currently at, interventions can be made more effective at encouraging behaviour change. Therefore, we also recommend further research to understand how different types of intervention beyond informational strategies can be tailored to individuals at the different stages of change for maximum impact on behaviour changes. We believe that this knowledge may help researchers and practitioners alike to design more effective interventions aimed at encouraging sustainable consumer behaviours going forward. Given the importance of behaviour change in tackling the current environmental problems that we face (IPCC, 2014), further research that teaches us how to better encourage sustainable consumer behaviours is extremely important and timely.

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